ABSTRACTED

Knitted Outerwear Times

the official publication of the
national knitted outerwear association
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murray hill 3-7520

sweaters · swim suits · infantswear · knit fabrics · polo shirts · gloves · hosiery

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SPECIAL ISSUE: 45th KNITTING ARTS EXHIBITION

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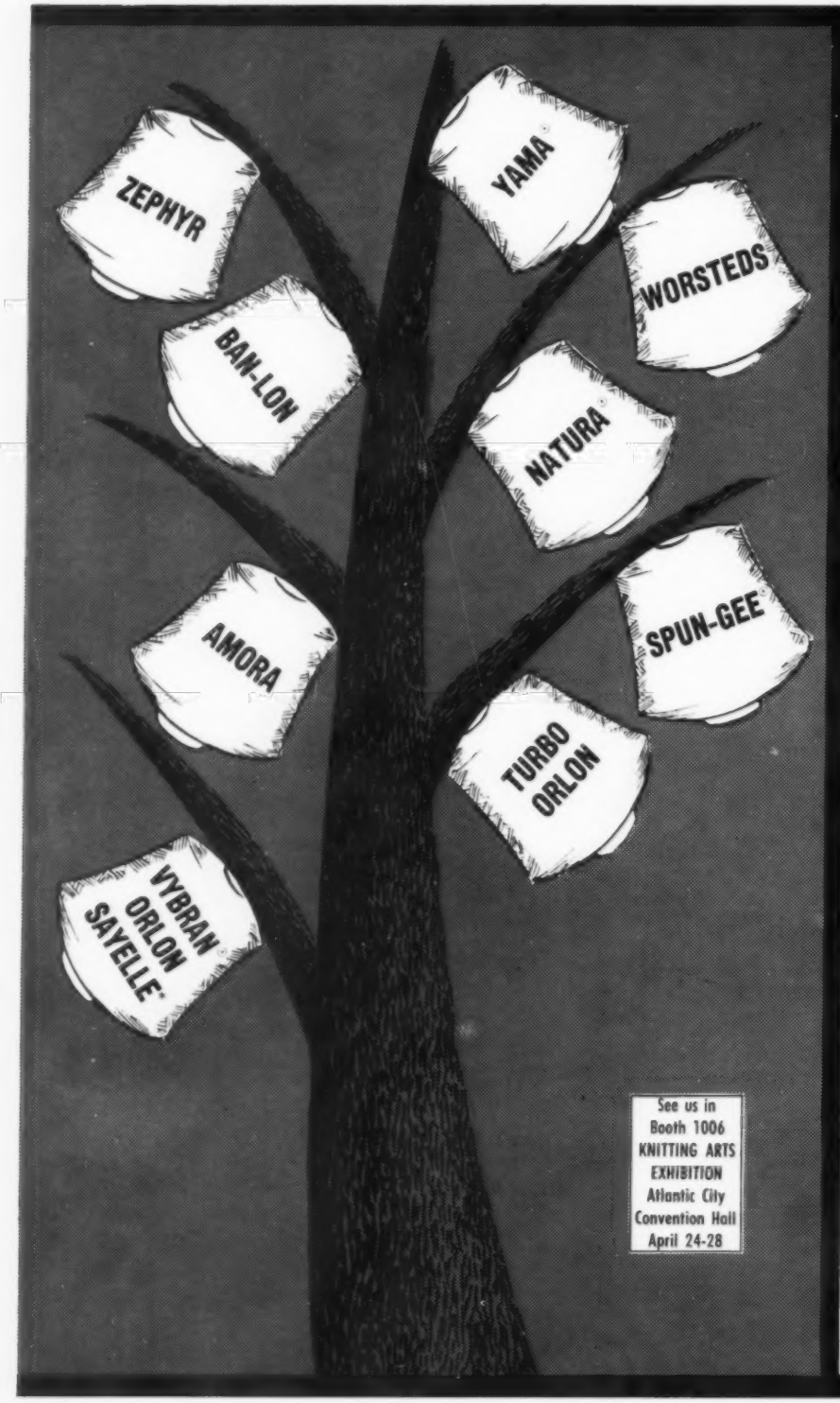

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The Knitted Outerwear Times being the official publication of the National Knitted Outerwear Association, is exclusively devoted to the dissemination of information, the exchange of opinion, the stimulation of trade, and the general improvement of the knitted outerwear industry in accordance with the Association's basic objectives as expressed in the preamble of its by-laws.

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Knitting Arts Exhibition

Show Spurs Equipment Developments

By SIDNEY S. KORZENIK
Executive Director and Counsel
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BECAUSE of the intensification of competition both international and domestic and the resulting sensitivity to the cost disadvantages of obsolete machinery, much attention in textile management is being focused on equipment renewal. In fact interest in new machinery in the textile industry and particularly in the knitting industry has rarely, if ever, been higher. The Knitting Arts Exhibition this year is therefore propitiously timed.

Plant modernization is not only a matter of management's self-interest. It has become a matter of public concern. The Pastore Committee, whose mission is the study of the special problems of the textile industry, issued its supplementary report only a few weeks before the opening of the Knitting Arts Exhibition of 1961. It underscored there the vital need of the textile industry to modernize as rapidly as possible. It also repeated its earlier recommendation that the Internal Revenue Service publish as soon as possible a revised schedule of depreciation rates, permitting a more rapid write-off for tax purposes and thus encouraging capital expenditure.

Accelerated Depreciation

Since the presentation of the first report of the Pastore Committee in 1959, public discussion has shown that there exists a growing body of opinion shared by many, including some in the Government, favoring a more realistic and liberal schedule of depreciation allowances. The old rate tables are themselves obsolete. There is little doubt that they will be revised in the near future. But the point to be noted here is the growing recognition of the need of mill management to keep competitively keen through equipment modernization.

In the knitted outerwear industry, the interest in new machinery has still a more urgent basis. High-speed and efficient operation are not our sole considerations. The introduction of novelty and the creation of diversity are essential. Hence, among knitted outerwear and swimwear men there is always a special degree of curiosity about new technological developments, and a more than common readiness to accept the new and put it to effective use. The very nature of the industry has placed a premium on alertness in discovering new opportunities. That is why the Knitting Arts Exhibition has traditionally proved so compelling an attraction to so many outerwear and swimwear men not only from the United States industry but also from abroad. So far as the American outerwear industry is concerned, attendance comes as close to 100 per cent as at any function of any major industry in the country.

Spotlights Innovations

This knitting arts show has in fact provided a center for the demonstration of new ideas and for the diffusion of information on trend-making new machines and materials. It is worth noting from a review of the last few shows in the KAE series how many scientific developments of later significance to the industry were first presented through the medium of this Exhibition.

Many will recall the 1955 KAE, where some new outerwear full-fashioning machines, especially the four-section type by Robert Reiner, were presented. There, too, was the first indication given to the United States market of certain European post-war machine models that have since then developed a certain degree of popularity, like the Mayer Overnit. In yarns, this was the show where many acquainted themselves with the production of the new high-bulk Turbo-Stapler types now common in both Orlon and Acrilan. And it was at this exhibit that the industry saw what could be done in textured nylon, using nylon 66 and nylon 6 to achieve cross-dyeing effects, as demonstrated at that time by Allied Chemical Company.

Recall next the 1957 show, where the industry focused attention on the high-speed interlock sweater-strip machines, which followed in the lead of the Philip machine, the number of feeds being increased, the cylinder being made wider, and the number of needles per inch being also increased for wider fabric. That was the year in which Philip also introduced his first model of full-fashioning outerwear machine, the first in the world to combine in a single unit the capacities to knit jersey and transfer to rib knitting.

Other New Machines

One of the most significant developments at the 1957 Exhibition, especially for the boost it gave to the renascence of the knitted swim suit, were the several yardgoods machines for elastic swim suit fabric that were there displayed. Also, that was the year in which V-bed flat machines were demonstrated with a wider scope of stitch formation particularly appropriate for knitting collars and trimmings for full-fashioned garments.

The 1959 show introduced the Morat, Terrot and Lebocey machines for double jersey fabric, which has since then enjoyed a rising popularity. That show also marked the demonstration of utilizing the spring beard needle in the construction of high-pile fabrics with the use of sliver (which up to that time had been used only with latch needle machines.)

The list of significant scientific advances contributed in this succession of recent exhibits might be easily augmented. The examples given are intended to be only illustrative and are not a complete catalog, of course.

But the point is clear.

Here is a reservoir of ideas replenished every two years through this series of industrial fairs. Here the knitgoods producer can see, examine, question and discuss new developments, educate himself and keep abreast of technological changes. Perhaps the special interest of the knitted outerwear industry in new equipment and hence the

(*Continued on Page* 5)

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special value of the show to this branch of its audience can be best demonstrated by a few figures.

The most recent available, as issued by the United States Bureau of Census, indicate that in 1958 knitted outerwear mills spent a larger total in capital outlays than ever before, $11,-155,000. Similar data for 1959 are not available, but we can estimate with reasonable assurance that the total rose above $12 billion. Incidentally, this does not include the capital expenditures made by knitted fabric mills which in 1958 reached $7,132,000. In view of the growth of high-pile fabrics as well as the so-called double jersey types, it would not be surprising if the total in 1959 were over $9 million.

The total value of shipments of knitted outerwear mills alone in 1958 is stated as $813,577,-000. No figures on profits are available from this source. But if the profits on sales after taxes for the industry as a whole were no more than two per cent (which is rather high, especially when compared with the figures given in Dun and Bradstreet's sample study on the industry), the industry's expenditures for capital equipment represents a very high proportion of its earnings —as high, probably higher than most other branches of the knitting industry.

This says a great deal about how strongly the industry feels on the subject of plant modernization. It also says something significant about the value of the Knitting Arts Exhibition to manufacturers who are so concerned and who are spending so much to keep abreast of their industry's advancing technology.

NKOA RECEPTION AT HOTEL SHELBURNE

Members of the National Knitted Outerwear Association attending the Knitting Arts Exhibition are invited to an open house and reception 6 to 7:30 P.M. Wednesday, April 26 at the Hotel Shelburne, Michigan Avenue on the Boardwalk. Members are also invited to visit the NKOA reception booth at the exposition.

Knitting Arts Exhibition

New Fiber Yarn And Equipment Developments Introduced

By CHARLES REICHMAN, Editor

EQUIPMENT manufacturers, yarn processors, fiber producers and dyers and finishers serving the knitted outerwear trade have been sticking pretty close to their knitting these past several months, and the results of their research and development efforts will be unveiled for the first time at the 45th Knitting Arts Exhibition which opens at noon today in Atlantic City's mammoth Convention Hall.

Not only will visitors to the "largest knitting show on earth" be struck by the many innovations in the art of knitting, fabricating and packaging and marketing outerwear that will be on view but they are also bound to be impressed with the Hall's new look. Since the last Knitting Arts Exhibition in 1959, the famed Convention Hall has undergone a $3,500,000 face lifting job.

In contrast to the knitting show two years ago, this year's exposition is a far bigger undertaking; in fact, it is the largest show in the 45-year history of this biennial event. The total of 215 exhibitors—roughly 15 per cent more than at the 1959 KAE—collectively occupy much more space than two years ago. In addition, the equipment displays, especially of knitting units, will feature far more moving machinery than was ever before seen at this knitting industry exposition.

Although the chief interest of visitors to the show will naturally be on the "live" demonstrations of weft and warp knitting machinery, exhibits of numerous types of other equipment used in the manufacture of knitted outerwear, underwear and hosiery will also attract attention.

Apart from practically all of the leading builders of knitting equipment, the show's roster includes: close to 50 yarn throwsters and processors, 12 major manufacturers of synthetic fibers in addition to suppliers of labeling and packaging equipment, producers of looping, sewing and cutting room machinery, manufacturers of dyestuffs and textile chemicals, skein, package and piece dyers and manufacturers of dyeing and finishing machinery.

Other products which will be on display include elastic fabrics, knitting needles, stop motions, lubricants, materials handling devices and equipment, pressing machinery, winding equipment, urethane foam and laminated fabrics.

Advance U. S. and foreign registrations indicate that by closing time on Friday, the show will draw well over 15,000 executives from all branches of the knitting industry—25 per cent more visitors than were clocked in at the 1959 KAE.

The number of knit goods manufacturers from foreign countries also will be considerably in excess of the record number who visited the preceding exhibition. Large delegations are expected especially from England as well as from a number of countries north and south of the border. Visitors from Mexico and South and Central America and Canada have in the past been the most numerous at the Atlantic City show.

Fibers and Yarns

With practically every major chemical fiber producer participating in this year's exposition, it is to be expected that most of the fiber and yarn exhibits will center on the synthetic rather than the natural fibers. However, with wool currently experiencing a strong comeback in many areas of the industry, yarn processors at the show are planning to devote almost as much display space to their wool and specialty fiber yarns as to yarns spun from the wide variety of synthetic fibers that are now available to knitted outerwear and knitted yardgoods producers.

Spinners of combed and carded cotton knitting yarns whose participation in KAE goes back many years, also will have eye-catching exhibits. In cotton yarns, interest will largely center on mercerized and long staple yarns, both of which have been gaining in importance in outerwear, especially for knitted shirts, knitted dresses and knit blouses.

Developments which will be on view in synthetic fiber yarns divide into two categories — spun yarns and textured filament yarns. The greater emphasis will, of course, be on the spun yarns since they account for considerably more of the industry's raw material consumption than the textured filament yarns.

(*Continued on Page* 7)

SEMINAR TO WEIGH KAE DEVELOPMENTS

New developments in knitting technology at the 45th Knitting Arts Exhibition will be discussed at an American Society of Knitting Technologists seminar Wednesday morning, April 26, in Room 13, Convention Hall, Atlantic City.

Speakers will include A. Reisfeld, director, research and development, Gehring Textiles, Inc., who will discuss "New Fields for Tricot and Raschel Knitting"; George A. Urlaub, knitting consultant, who will talk on "The Thermal Underwear Story"; Dr. Thomas Edman, professor of knitting, Philadelphia College of Textiles and Science, who will speak on "Knitted Fabrics in Heart and Arterial Surgery"; Robert Peel, vice-president research, Singer-Fidelity, Inc., who will talk on "Aspects of Seamless Hosiery Knitting"; and Victor Lombardi, assistant to the president, Scott & Williams, Inc., who will talk on "New Techniques for Patterning Jersey Fabrics."

Admission is open to all persons attending the Exhibition. Tickets will be available at the time of registration.

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At the last count spun synthetic yarns represented well over 40 per cent of the industry's aggregate yarn consumption while the textured filament yarns were in the neighborhood of 15 per cent.

Spun Yarns — Significant among the spun yarn displays will be blends of Orlon, Orlon and wool, Acrilan and wool and other acrylic fibers such as Creslan and Zefran with wool. These yarns are being introduced by yarn spinners at the show largely for use in the presently popular double jersey fabrics. At least insofar as the Orlon and wool yarns are concerned, the yarns for double knits are processed differently from the conventional 80/20 Orlon and wool combinations. The latter are invariably processed on the Turbo system from tow or on the cotton spinning system from high and low shrinkage staple. The Orlon and wool combinations for double jerseys are completely relaxed yarns; they do not bulk up and possess relatively little residual shrinkage.

Attention, however, will no doubt be directed too to the conventionally-processed high-bulk 80/20 Orlon and wool yarns. Demand for these is currently attaining boom proportions largely as a reflection of the widespread use of these yarns in knitted fabrics for lamination to urethane foam.

Combinations of acrylic fibers and cotton on an 80/20 basis and, in some instances, in a 50/50 proportion will also be promoted by many of the yarn exhibitors. These blend constructions are also designed for the double knit jersey field — in feathery, summer apparel rather than fall and winter-weight garments.

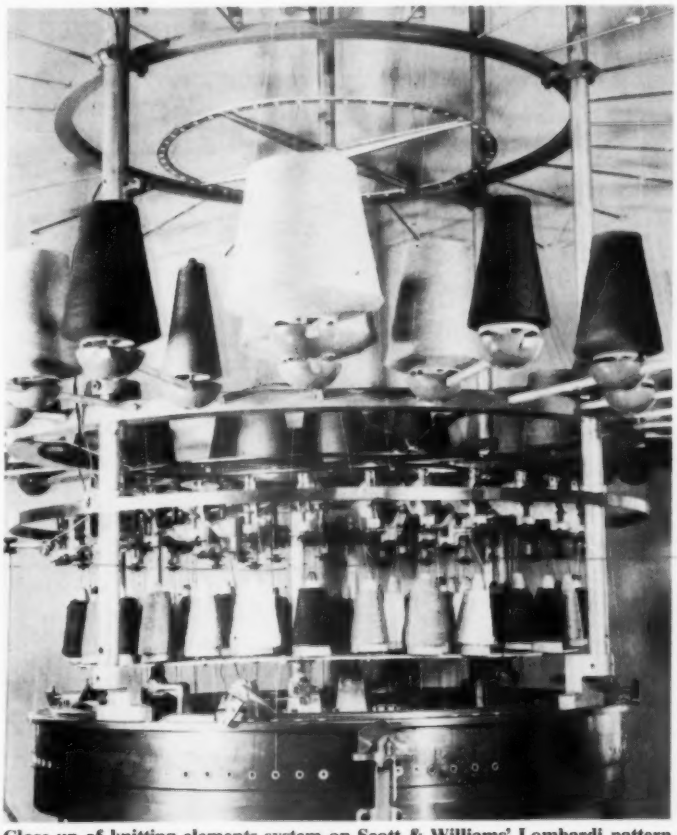
New synthetic fiber yarns for sweater knitters that will be underscored in the yarn and fiber producers' exhibits will consist of blends of Acrilan 16 and 16.56, Creslan either in 100 per cent form or twisted with textured nylon, Zefran and linen, Arnel blended with either cotton or Corval rayon and the new Orlon fiber types. The latter category will include the following:

• Type 44, the new acid dyeable fiber which in combination with conventional Type 42 Orlon can be used to produce contrast color effects via either the yarn or piece dyeing routes.

• Type 24, the new three denier Orlon Sayelle bi-component fiber for fine gauge knits.

• Type 41, the mohair-like fiber for blending with Orlon Sayelle.

• Type 72, a DuPont acrylic fiber with a built-in whiteness and designed for blending with Type 42 Orlon on an 80/20 basis.



Close-up of knitting elements system on Scott & Williams' Lombardi pattern wrap machine.

Textured Yarns—In textured filament yarns, throwsters as well as fiber producers will introduce yarns based on the two new tri-lobal fibers—DuPont's Antron and Chemstrand's Cadon. In addition, they will show yarns in which conventional nylon 66 filament is combined with such nylon 6 filament yarns as Caprolan and Enka nylon and in which one or the other or both of these two nylon types are combined with Dacron.

Use of Dacron and of nylon of different opacites will be especially underscored in the exhibit of Joseph Bancroft & Sons Co., Inc., owners of the Ban-Lon license. A Texturalized Type 51 Dacron filament yarn in a bulky knit construction will be shown along with knitted fabrics in which dull, semi-dull and bright nylon are employed to create interesting patterned and textured effects.

Utilization of Antron and Cadon will be in both fine and coarse gauge fabric constructions, the former in both full-fashioned and circular knits, the latter turned out on three-cut V-bed flat and circular links machines.

Knitters' interest will also be aroused by at least one yarn exhibitor in Orlon Cantrece, DuPont's textured Type 82 acrylic filament yarn. The potentiality of this yarn for lightweight double jersey dresses and blouses as well as sweaters duplicating fine Italian silk knits will be among the points that will be stressed.

Circular Machines

Knitting machines for the manufacture of double jersey dress and suiting yardgoods and several new fancy stitch sweater-strip machines will be among the highlights of the circular machinery displays at the Exhibition. Contrary to the trend at the two preceding knitting shows, emphasis in circular knitting equipment design has shifted from high-speed single purpose machines to multi-purpose units of broad stitch and pattern flexibility. However, in engineering the latest circular models, the equipment builders have by no means lost sight of the need for machinery of high productivity.

Sweater - Strip Machines — Several new types of sweater-strip machines, some heretofore unavailable on the market, will be shown for the first time. Included among these are the following:

• Wildman - Jacquard's 30-inch diameter circular links machine, Model LHDS-6, a unit with a broader stitch and pattern range than previously possible on a superimposed cylinder machine of this type.

• The new Philip fully automatic multi-feed circular machine capable of turning out sweater-strips in jacquard, links and links and transfer patterns, and incorporating controlled racking of one or more dial needles in any part of the machine.

• Several foreign interlock sweater-strip machines not heretofore displayed in this country. The machines for the most part are multi-purpose types, capable of turning out plain and jacquard pattern fabrics in garment-length form with secure welt and in 1 x 1 or 2 x 2 rib cuff or any other desired rib formation.

The latter will be in addition to the famed American-built limited purpose interlock sweater-strip machines that are so widely employed in the manufacture of high-bulk Orlon and textured filament nylon sweater-shirts. So far no foreign circular knitting machinery builder has been able to come up with or appears interested in perfecting an interlock sweater-strip machine that duplicates the fantastic output rates of, say, the Philip 52-section machine, or the somewhat less strikingly high production possibilities of Wildman-Jacquard's Model A1 or Scott & Williams' Model MFRC.

Among the foreign - built

(*Continued on Page* 9)

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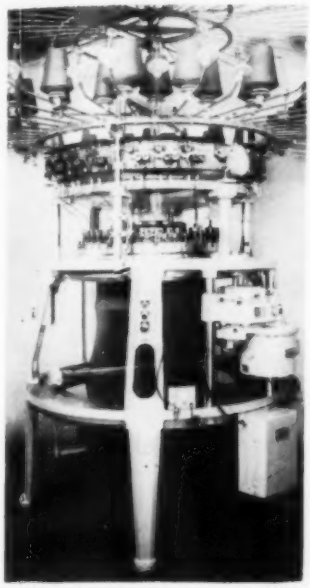


Wildman-Jacquard's new PBP-44 Challenger.

sweater-strip machines that will be on view, several possess features of far than mere passing significance. Notable in this respect, is the new Morat FKT-Seuma. An offshoot of the company's well-known jacquard pattern yardgoods machine, this unit, like all sweater-strip machines, turns out continuous lengths of sweater bodies complete with selvedge edge, tubular welt, 1 x 1 rib trim and separated one from another by a readily removable draw thread course.

Probably the machine's outstanding feature is its electro magnetic controls over the dial cams and pattern wheels and the use of this same principle in the feeding of the extra end of yarn for the knitting of the rib trim and in the feeding of the yarn for the draw thread course. This machine has never been publicly on view in this country; its sister yardgoods model was, however, one of the attractions at the 1959 KAE.

Another pace-setting machine in the foreign sweater-strip category is the Mayer Suprint machine, a 30-inch diameter, 30-feed machine which produces stitch shaped garment lengths with attached 1 x 1 rib bottom and separation. The machine can be operated either as a sweater-strip unit or as a yardgoods machine and can turn out fabric structures in plain and colored interlock as well as in horizontal and checked stripes.

To change the machine's operation from sweater-strips to continuous yardgoods all that is required is to place the chain control mechanism out of action. This is done by simply flipping a small hand wheel.

Another foreign unit in the sweater-strip category that will be underscored at the KAE show is Fouquet's Model SJD, a 30-inch diameter machine with 30 feeds, of which 28 are knitting feeds.

Double Jersey Yardgoods Machines — Although the spotlight in this machinery area will no doubt be focused on the many types of foreign-made double jersey machine, the double knit units recently developed by U. S. machinery manufacturers will unquestionably also be the center of attention not only because of the inherent features these machines possess but also as the possible answer to the delivery problems many knitters are still encountering with the foreign machines.

Prominent among the new double jersey machines that will be shown by domestic knitting equipment manufacturers will be both single and multi-purpose models. Wildman-Jacquard Company will show alongside of its JSD-24 and TJI-12, its new PBP-44 Challenger. In advance reports this machine has been billed as a fast-producing single and double pique unit capable also of turning out plain interlock and eightlock cloth as well as other conventional rib fabrics. The machine is equipped with 44 knitting feeds and has a 30-inch diameter cylinder and dial. Its cut runs up to 20 x 20 needles per inch in cylinder and dial.

Scott & Williams too will have a new double jersey machine to show. Its unit will be a single-purpose machine for knitting pique fabrics in large volume. The machine has 32 feeds, 30-inch cylinder and dial and comes in up to 18-cut.

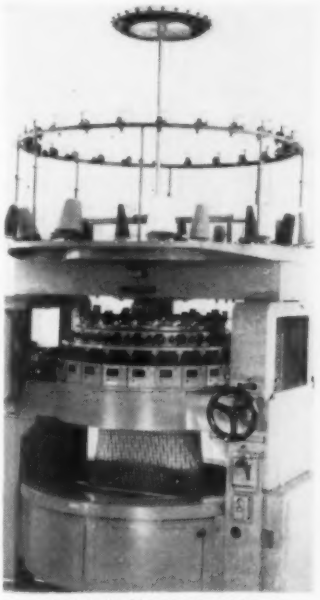
In view of the broad claims being made for it, the new Philip double jersey machine will probably evoke as much interest among visitors as the Philip Super Multi-Feed interlock machine did at the 1959 show. In development for over a year, the Philip machine is a multi-purpose yardgoods unit which has such features of a high-speed single-purpose machine such as wide cylinder and dial and large number of feeds. The new Philip machine is a 33-inch model with 44 feeds and up to 18 x 18 needles per inch in the cylinder and dial. Of dogless construction, it comes equipped for patterning with oversized pattern wheels and a patented trick wheel system and can turn out both plain and fancy double jersey fabrics. Dimensions of its pattern field is 72 inches straight across without spiral and 144 inches in height.

Vying with these American-built machines for the visitors' attention will be an unusually large number of foreign double jersey machines, most of which are already fairly well known to U. S. knitters and some of which have been in place in mills for some time. However, at least one foreign machine builder, Terrot, will show a brand new unit—a 30-inch diameter, 36-feed high-speed double jersey knitter. The Terrot display will also include other double jersey machines as well as a four-color striper model. Among the other foreign knitting machine builders who will be represented at the show are the following:

- Edward Dubied & Cie, which will show its Wevenit Model A-24
- Morat, with a display of the popular yardgoods version of its Seuma sweater-strip machine
- Mayer & Cie, with a demonstration of its Jacquard Overnit II machine which produces double jersey and jacquard pattern fabrics in non-spiral designs
- Fouquet, which will be represented with several machines in the multi-purpose and single-purpose double jersey fabric range.

On display too will be a yardgoods machine produced by Lebocev, the French knitting equipment builder. The British Bentley Group will also be represented in this machinery category with large diameter multi-feed units for the production of double knit fabrics.

Other Yardgoods Equipment —Despite the great emphasis being placed on double jersey yardgoods machinery, several



Dubied's Wevenit A-24.

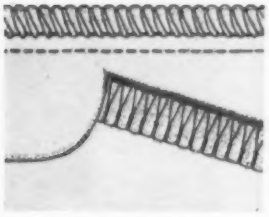
innovations in other types of circular knit cloth equipment will be unfolded at the exposition. Scott & Williams, for example, will demonstrate for the first time the Lombardi pattern wrap machine. Designated Model LPW, the machine has a wide fancy fabric scope. It is a 32-feed, 30-inch diameter unit in 18-cut, and has needle selection via three-position pattern wheels. It is equipped also with four-finger striping boxes and the conventional wrap feeding arrangement.

Data on the new sinker top machines which Supreme Knitting Machine Co. will introduce were not available at this writing. However, it is understood that this company will show a number of new units of wide stitch potentialities.

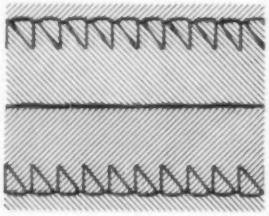
In the field of high-pile fabric knitting, Wildman - Jacquard Company will present its sliver knitter equipped for the production of three-color high-pile liner cloth. The machine is the Model FBW-6 and comes with a 23-inch diameter cylinder. Tompkins Bros. Co., the well-known circular spring needle machinery manufacturers, will introduce their recently perfected 70-inch diameter carpet knitting machine. This machine is designed for the manufacture of loop carpet and paper scrim. It operates on a system somewhat

(*Continued on Page* 11)

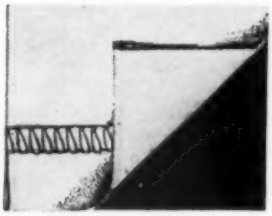
THERE'S A SINGER® 246 OVEREDGER TO DO THESE...



Dual Stitching On Shirts



Serging



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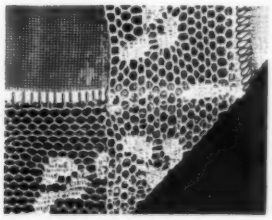
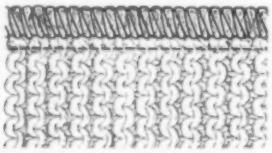
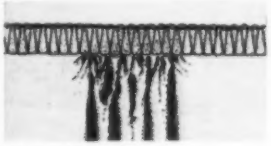


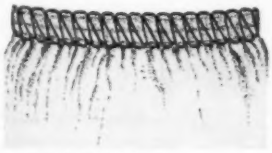
Joining Lace



Dual Stitching Knitwear



Intermittent Gathering



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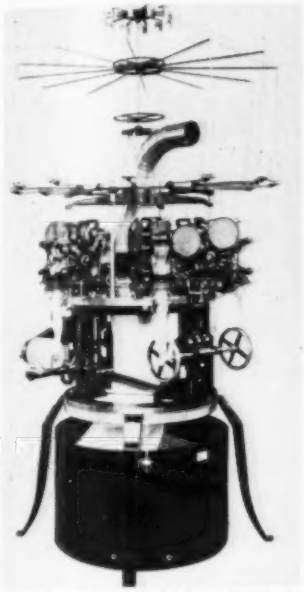


Wildman-Jacquard Sliver PBW-6

comparable to the manufacture of terry cloth on a loop wheel spring needle machine.

V-Bed Flat Machines

V-bed flat machines of somewhat broader stitch scope than is now possible will mark the displays of this type of machinery. V-bed flat machines have been traditionally used in this country largely for the manufacture of collars and trims for both full-fashioned and circular knit cut-and-sew garments. However, with the rise of the bulky sweater vogue, many mills have rediscovered the potentialities of the V-bed flat machine, despite its low operating rate, as a useful tool for the manufacture of these jumbo knit garments. Now with knitted dresses becoming popular again, the adaptability of the V-bed flat machine for this type of knitted garment construction is also being recognized. It is for this reason as well as the machine's scope for color and rib trim knitting that interest will be high in V-bed flat machines at the show.

Knitwear manufacturers will find numerous machines in this category to evaluate. Among the more prominent ones will be the following:

- A new double lock model in the Universal flat machine range, called the Supramat-B.
- A Spanish-built V-bed flat unit with interesting engineering features as well as broad stitch versatility
- A double lock V-bed flat knitter built in West Germany by Walter Weiffenbach, a machine which had aroused considerable interest among American visitors to the Milan Textile Exposition two years ago.
- New 2½ and 3-cut versions of the well-known Queens Model B fully automatic single system V-bed machine. Up to now, this model has been produced only in four to 12-cut inclusive. The new coarse-cut Model B units, as the finer cut models, are designed primarily for the production of collars or rib trims. However, the latest jumbo stitch versions are equally adaptable to the manufacture of continuous lengths of bulky sweater-strips.

Other machines which will be on display include new Stoll units, a 63-inch fully automatic unit called the McRoth-ATR and the latest addition to the Dubied D Group of machines called Type DLA. The latter is a double lock high and low butt needle machine equipped with a widening attachment. Dubied will also show a hand flat machine-Type NHF-2, equipped with high and low butt needles in 2½ needles per inch and 40-inch wide needlebed.

Full-Fashioned Machinery

Three full-fashioned machines will be exhibited in comparison to only one at the 1959 KAE show and none at the 1957 show. A complete four-section production model of the Philip full-fashioned rib and jersey machine will be the highlight of the full-fashioned machinery demonstrations. First shown to the knitting trade at the 1959 exposition, in single section operation, the machine will now be demonstrated with all four sections in full operation. The machine produces sleeve and sweater blanks in jersey with attached 1 x 1 rib trim in continuous sequence, each sleeve or body section separated from the next by a draw thread course as in conventional circular sweater-strip knitting. At the time it was first introduced, the machine was hailed as a major break-through in the engineering of full-fashioned knitting equipment. It is understood that orders for the machine will be taken at the show and that commercial production of these unique units will get under way this year.

Knitwear manufacturers in this country for the first time will be able to see a public demonstration of the Bentley-Cotton's fully automatic UO/AE machine. A multiple section unit, the machine incorporates a card control set-up which governs the sequence of courses and fashioning frequencies. From a card only 18 inches in length the machine can undertake continuous production of a sweater front, sweater back and two sleeves in sequence. The punch-card control is also geared to initiate the automatic take-up of sweater or sleeve blanks between knitting of sets and the operation of the striping chain. This is in addition, of course, to controlling the number of courses and the fashioning frequencies in each sweater or sleeve blank.

The third full-fashioned machine that will be on view is Wildman-Jacquard's Model TFS-21. The machine is a single section, full-fashioned outerwear unit knitting 21 gauge body or sleeve blanks. The unit to be demonstrated will be turning out sweater bodies. However, the single section machine can be used interchangeably for body blank or sleeve blank output on a full production basis. Many full-fashioned mills also utilize the machine for the manufacture of sample lines obviating the necessity of using an extensive multiple-section machine for this purpose.

Dyeing and Finishing Equipment

In contrast to previous years, dyeing and finishing equipment looms important at the Knitting Arts Exhibition. Machines in this category on display will range from new enclosed skein dyeing kettles for handling wool and high-bulk Orlon yarns to package dyeing equipment. For dyeing continuous lengths of knitted yardgoods, Gaston County Dyeing Machine Co. will introduce a beam dyer capable of handling either circular knit or warp knit fabrics at the open width. Although circular knit fabrics are currently chiefly dyed in winch-type dye becks, a number of mills have been investigating the possibilities of dyeing the fabric on a beam basis. Gaston County's new machine was developed in cooperation with Burlington Mills.

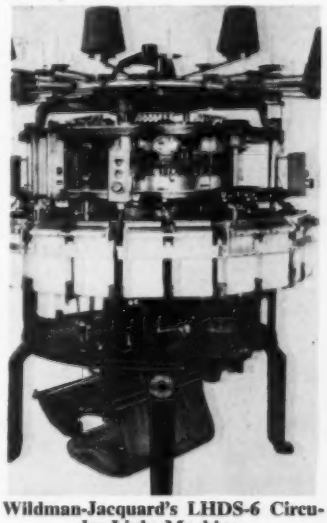
In the field of finishing equipment, manufacturers will find a number of calendaring and decating units on display suitable for processing of double jersey fabrics as well as opening and slitting machinery used in preparing tubular knit fabrics for semi-decating and for lamination to urethane foam.

Notable among the finishing units that will be on view is a machine which combines shrinking, decating, pressing and steaming in one continuous operation. A French-built unit, the machine is called the Domisse and will be shown by Speizman Knitting Machinery Corp. It is claimed to be especially suitable for the finishing of double jersey yardgoods. Not only can the machine calendar such fabric as well as other types of knitted yardgoods, but in the process steams and automatically spreads the tubular cloth to desired width.

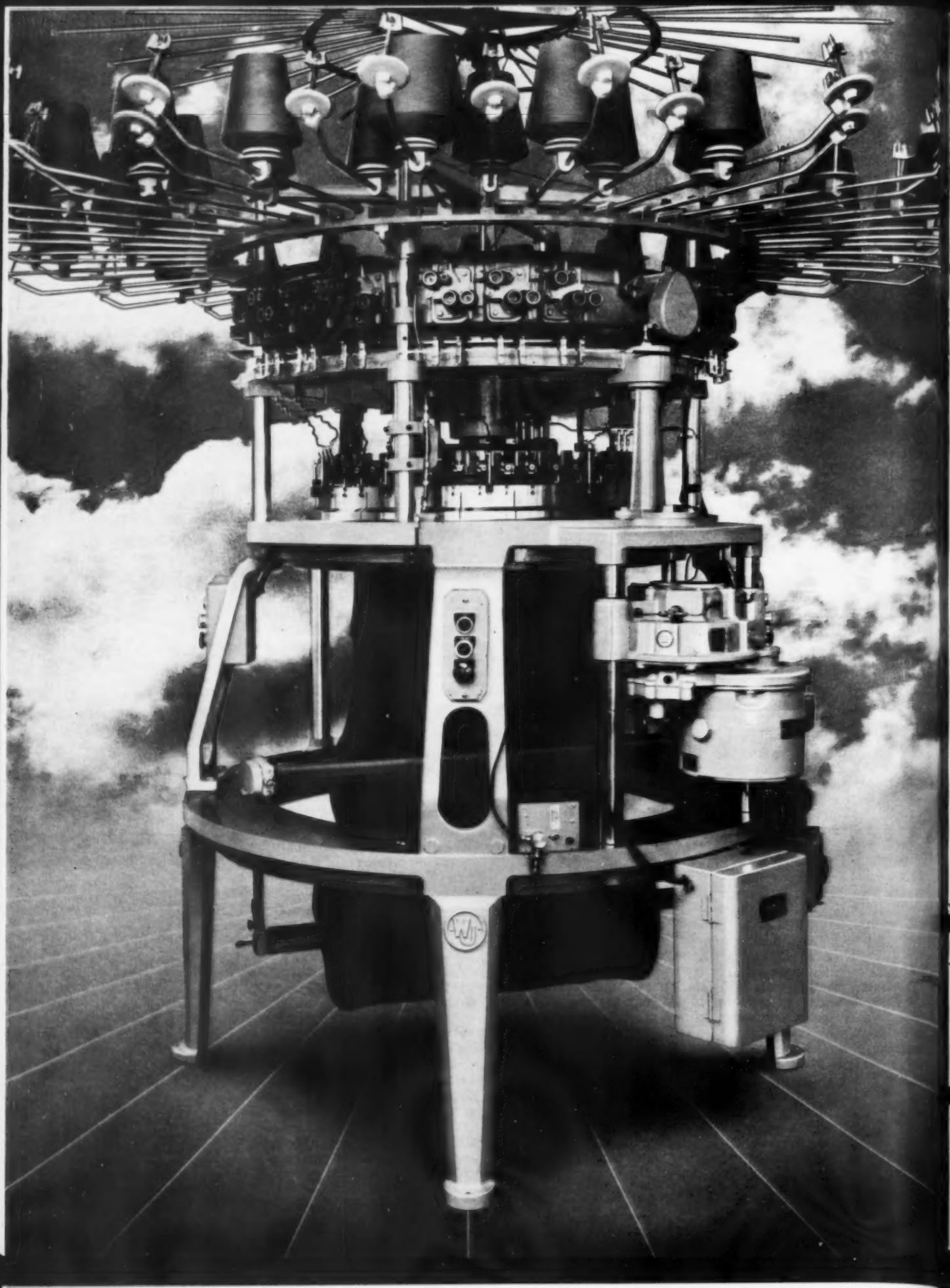
Spinning Units

As in previous years, there will be a number of displays devoted to new spinning equipment. Whitin Machine Works, for example, will demonstrate a French machine for the production of stretch and bulk type textured filament yarns on the false twist principle.

Another demonstration of new spinning equipment will be in the booth of Sacco-Lowell which will introduce its new Model SJ-4C worsted spinning frame. The unit will be shown turning out 100 per cent wool yarns as well as Creslan acrylic fiber yarns.



Wildman-Jacquard's LHDS-6 Circular Links Machine.



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PBP-44
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Knitting Equipment Review

Recent Developments In Circular Sweater-Strip Units

By J. B. LANCASHIRE
Senior Lecturer, School of Textiles
Leicester College of Technology

FOLLOWING the introduction about four years ago of the single purpose multi-feed sweater-strip machine of the cylinder and dial type, there are now on the market limited purpose machines of the same type, also equipped with multiple feeds. While primarily intended for the manufacture of interlock garment lengths with draw thread, welt and 1 x 1 ribbed border, the limited purpose machines also offer scope for tucking on the dial, thus enabling garments to incorporate single pique and other tuck interlock bodies with 1 x 1 rib, half-cardigan or fancy rib border. Garments are also producible with bourrelet patterned bodies.

A typical limited purpose machine of modern design has 28 ordinary knitting feeds, a draw thread feed and a press-off position. At every odd-numbered feed there is one yarn guide that can be withdrawn automatically from yarn feeding position and at every even-numbered feed there are two yarn guides, one fixed in feeding position and the other movable into and out of feeding position.

Producing the Welt

The welt itself consists of one circuit of stitches on short cylinder needles only and one circuit knitted on short dial needles only.

The ribbed border is knitted at the even-numbered feeds, using two ends of yarn together at each of these feeds, if desired, and when the requisite number of courses has been made the stitch is automatically changed to interlock by placing thread guides in feeding position at the odd-numbered feeds and, assuming that the supplementary guides at the even-numbered feeds have been used, taking them out of action.

Among cylinder and dial garment-making machines there are now some that have been fitted with an extended dial shogging mechanism for the production of racked rib effects. Dial displacement is limited to one needle space but shogging can take place as many times during each revolution of the machine as distribution of feeds and nature of stitch may demand. Since the cylinder and dial needles cannot pass one another across the knitting arcs when shogging takes place, special needle arrangements have to be used.

A new combined jacquard knitting and loop transferring sweater-strip machine built with stationary needle cylinders in diameters of 18, 20, 22 and 30 inches, and in gauges 12 x 12 and 14 x 14, can produce bodies with 2 x 2 ribbed waist as well as a very large variety of other fancy stitch shaped outergarments having either 1 x 1 or 2 x 2 ribbed borders and cuffs. The cam cylinder is subdivided into eight sections: the first and fifth are employed for loop transferring and the others correspond to knitting feeds. In each section there is a battery of 37 elliptical cams, each cam being coupled with a star wheel and working in conjunction with a spring-loaded lever to select cylinder needles for patterning. Every knitting section is also equipped with a four-finger yarn changing unit which incorporates a drum selector having 12 circumferential positions.

Bulky Rib Knitter

A demand for bulky knit garments has led to the introduction of sweater-strip machines of extra coarse gauge offering unique facilities for the knitting of tuck rib textures, including half and full cardigan. In one instance, in order to meet the exceptional requirements of a three cut cylinder and dial machine which has to draw relatively long loops, often using several ends of yarn together, and which is likely to have to exploit the full possibilities of loop accumulation, an extra deep cylinder has been fitted and verge bits have been extended radially. To cope with other problems associated with coarse gauge knitting the yarn stand is made very robust and accommodation is provided for unusually large packages. To minimize the bowing tendency of the fabric after it leaves the needles, three drawing-off rollers are fitted.

Circular Links Type

As an alternative to the cylinder and dial type of machine for the knitting of plain jersey bodies with rib ends, there is now on the market a 28 feed machine, having superimposed needle cylinders 30 inches in diameter, which is offered in cuts ranging from five to 16 needles per inch. Double-headed needles are used on this double cylinder machine, each needle having latches whose outer extremities when closed project beyond the hook at either end. The sliders differ from others used on double cylinder machines in that they have V-shaped projections to engage with the needle hooks, the extension beyond this V-shaped projection having a tip which is specially shaped for the opening of the needle latches. In addition to the 28 knitting feeds the machine has two-needle transferring stations, one at which needles can be transferred from bottom to top sliders to change from plain knitting to 1 x 1 rib and the other at which the same needles can be transferred from top to bottom slides to change back to plain knitting.

Immediately after the change of stitch from plain to 1 x 1 rib has taken place, with a view to starting another garment length, the sliders in the top cylinder to which needles have been transferred are guided into a welt track and they remain in this track while passing several feeds, thus making locking courses in the bottom cylinder. On completion of the locking courses a circuit of 1 x 1 rib stitches is knitted with a draw thread which is substituted for the main yarn at one feed. Between this feed and the next is a press-off cam in the bottom cylinder and at this stage it is brought into action to make a separating course.

The first course of a new garment length is made by knitting in both cylinders at one feed and then a tubular welt is produced by knitting one course in the bottom cylinder followed by one course in the top cylinder. Subsequently, several courses are knitted with top and bottom needles in action to produce a predetermined length of 1 x 1 ribbed fabric before returning all needles to the bottom cylinder for plain knitting.

Double Cylinder Unit

A new feature of garment knitting on double cylinder machines is the availability of a double selection by means of which any needle already engaged with its bottom slider can be individually selected at each feed to do any one of four things. The first selection decides whether or not the needle shall be raised to clearing height. If it is raised to clearing height the second selection determines whether it shall be transferred to the top cylinder to knit a purl stitch or remain in the bottom cylinder to knit a plain stitch if it is not raised to clearing height the second selection determines whether it shall tuck in the hook or miss the yarn altogether.

Selections are made by rocker levers actuated by a jacquard mechanism from a punched card. One group of levers with its selecting mechanism constitutes an automat and on a six feed machine there are 24 of these. To give the double selection, the grooved roller of each automat is advanced twice during the time that each feed is approaching the arc of needles it controls.

RECENT MACHINERY TRENDS

- Broader scope in limited purpose interlock machines for garment-length knitting.
- Jacquard and loop transferring machine.
- Circular links types for bulky rib knits as well as jersey garment knitting.

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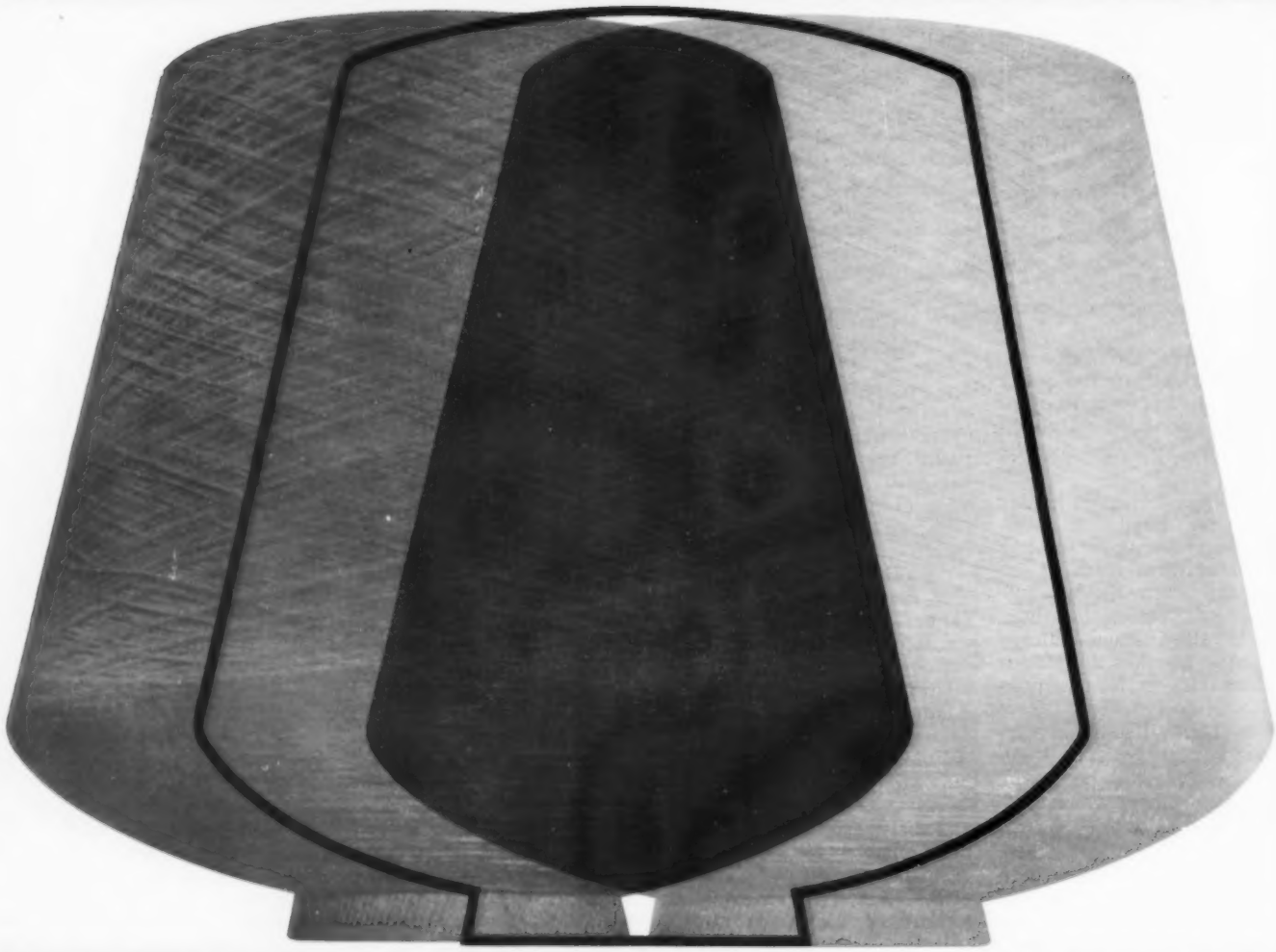

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Knitting Equipment Review

Trends In Circular Knitted Yardgoods Machinery

WHILE modern trends in the production of weft knitted yardgoods are very definitely in favor of latch needle knitting, there are still many useful purposes to which the springboard needle can be applied subject to the condition that, specialty structures apart, its use does not entail serious loss of output. In this connection the introduction of a new machine having a revolving needle cylinder roughly 30 inches in diameter cut with 25 tricks per inch is deserving of notice.

It has 20 knitting feeds and 10 laying-in feeds, and at alternate knitting feeds there are cut discs acting on needle boards for selecting knitting and tucking.

Designs can be developed in areas at least six times larger than those normally obtainable on sinker wheel or loop wheel machines and rate of fabric output is substantially higher.

The range of fancy fabrics producible on the machine includes combinations of knitting and missing and combinations of knitting and tucking as well as drop stitch structures and textures incorporating laid-in threads. Backing yarns can be passed between the two loops of the double loop stitches of the groundwork to produce true fleece fabrics.

Knitting Patterned Fleece

Some further progress has been made in the knitting of true fleece fabrics with patterned face on latch needle circular machines having 18 needles per inch, designs being developed in one color on a ground comprising single course stripes produced by selective knitting with a second color. The use of pattern wheels gives scope for figure designing in rectangular areas.

The use of sliver carding equipment to produce high-pile fabrics on loop wheel machines, production of openwork by float plating on latch needle circular machines, and extended application of the pelerine stitch to the transference of sinker loops to individual needles, are other developments in the manufacture of yardgoods on one set of needles.

A single cylinder open top machine for knitting purl fabrics has also been built; each cylinder trick contains a relatively short outer hook member having a butt on the side remote from the hook and also a long inner hook member having a butt on the same side as the hook. Fabric is drawn off upwards via segmental guide rails by means of an adjustable take-up mechanism and is wound around an overhead roller.

In the period under review the more important developments have been almost exclusively concerned with latch needle cylinder and dial machines for the knitting of double jersey fabrics. Among these machines there is now a multi-feed interlock model with needle cylinder 30 inches in diameter and 30 feeds, which offers facilities for horizontal striping by the selection of feeds to knit or non-knit according to pattern. The guide of any feed, when supplying yarn that is no longer wanted is lifted out of action, the cylinder and dial cams having been previously moved into non-clearing positions. The feeds are put into and out of action by a jacquard control mechanism incorporating a paper card or plastic film which is punched with holes where changes have to take place. Though new in its application to interlock machines, this method of striping has been utilized previously on circular rib machines and its working efficiency has been proved over a period of 30 years.

Among its advantages are reduced risk of occurrence of press-offs and the need for fewer ends of yarn, which means a smaller stand that one can accommodate larger packages, possibly with magazine supply. The availability of one knitting feed per diametral inch of the needle cylinder renders the machine a reasonably economical production unit, whether or not it is actually producing striped fabrics.

As compared with the standard construction of double jersey machines on which all camming alterations are made manually, there are now models on the market that offer facilities for automatic change. A small control unit capable of occupying 12 different positions can be placed at every feed of a 24-feed machine and can be built up with studs to initiate changes in the camming according to the knitting requirements, the changes being made feed by feed as the needle cylinder revolves. Each unit has a ratchet wheel and pawl by means of which it is turned when a cam situated underneath the rotating dial is put into actuating position. Whether or not the cam occupies its actuating position is determined by high and low links on a chain that is advanced one link after every revolution of the machine.

There are now many double jersey machines of the super-multi-feeder type on the market, the standard 30-inch diameter model being equipped with 44 feeds. These machines are adaptable to produce various fabrics including ordinary interlock, single pique, double pique, bourrelot and eightlock. Special precautions are adopted to prevent heavy accumulations of lint where knitting takes place and in some instances provision is made to enable extra long lengths of fabric to be wound on the batch roller before removal of the roll becomes necessary.

Positive Feed Mechanism

Adequate evidence is now available in support of the view that the standard of performance of double jersey machines in regard to the quality of fabric they make is greatly improved when yarn is supplied to the needles at a controlled rate by some form of positive feed mechanism. Great importance attaches to the exercise of complete control to prevent slippage from occurring in any circumstances. New positive feed mechanisms have recently been introduced, including one based on a Swedish idea that utilizes a master driving wheel for a tape which can make contact with flanged nylon wheels, the latter forming part of feeding units of which there is one at each feed.

When the feeding mechanism is in action, yarn is firmly gripped between the surface of the nylon wheel and the inner surface of the rotating tape, the grip providing the positive feed. Some modern machines make use of interchangeable feed wheels the various sizes of which, combined with tapered surfaces, allow for the various rates of feed to suit the full range of different fabrics.

In connection with modern high output double jersey jacquard machinery, an extra wide scope for patterning has been made available by punched paper card selection on machines that knit flat jacquard fabrics on 24 feeds and cloque fabrics on 36 feeds. Besides extending widthwise around the complete tube of fabric, the design depth can compromise any desired number of courses and, since each of the 24 feeds may incorporate a four finger striping unit, the designing possibilities are virtually unlimited. Embodied in machines of this type is a new automat construction in which the card, rotating continuously, rides on a drum having grooves disposed along lines that cut across lines drawn from driving pins on one side to corresponding pins on the other side. In all gauges up to and including 14½ needles per inch, there is a rocker lever for each individual cylinder needle, but in finer gauges each rocker lever works in conjunction with two needles, so that widthwise the unit of design extends over two wales.

Double Jerseys

Numerous new large diameter, multi-feed, fine cut machines have recently come on the market for the construction of single and double pique, eightlock, bourrelet and fancy rib jacquard fabrcis.

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Knitting Machinery Developments

Features Of Morat Circular Knitting Machine Models

GREAT strides have been made since the war in improving the automaticity and productivity of all kinds of machines by using a variety of electrical and electronic devices. This change from a purely mechanical to electrical or electronic control has been somewhat slower in the field of knitting machines than it has been elsewhere. Apart from using electronic equipment for controlling the drives of certain types of knitting machines and using electrical and electronic installations for stop motions on circular knitting machines, the mechanical control, in most cases, still rules supreme. A notable exception to this trend is the Morat FKT Seuma circular knitting machine.

This machine, which has been developed by a relative newcomer in the knitting machinery field, employs electrical controls to a very much greater degree than most other machines in this range. The Morat Seuma machine is built by Messrs. Franz Morat GMBH of Stuttgart Vaihingen in Western Germany. The company only commenced its existence as a knitting machine building firm in 1952, and since the founders of the firm have a background connected with the manufacture of electrical instruments, it is perhaps only natural that they should devote their special attention to this aspect of engineering. Sales and service of the machines in this country and Canada are handled by Stonehill Knitting Machines Corp.

Both models have certain features in common, and it is perhaps opportune to briefly discuss these first.

Engineering Features

The tripod support for the main base plate connects the various sub-assemblies in a robust and torsion free manner. The machines have a rotating cylinder and dial, and both cylinder and dial share a common drive. The cylinder itself is fitted with exchangeable steel tricks, and the dial is carried in the dial support housing. The completely enclosed housing rests upon the main drive bearing, the equalization bearing and a support column. Fitted into the housing is illumination for the cylinder needles and dial needles which assists in the supervision of the knitting elements.

The whole assembly blends well into the general structure of the machine. The driving elements of the machine are enclosed in a sturdy cabinet which also serves as one of the support legs for the base plate of the machine. This cabinet also contains the electrical and mechanical control instruments for the machine. The fabric take down mechanism on both machines incorporates a new principle which automatically changes the speed of the drawing off rollers in accordance with the speed of production.

Yardgoods Machine

The FK Seuma machine has been designed to produce jacquard type fabrics in the roll.

The driving cabinet mentioned above contains an infinitely variable machine drive complete with an electromagnetic brake and clutch which guarantees gradual starting of the machine from rest and an instantaneous stopping of the machine when required. The electrical installation in the cabinet includes all the necessary mechanisms for starting and stopping the machine by remote control as well as the stop motion installation for acting on both the needles and the yarn.

Also included in the control cabinet is the main chain which controls the settings of the cams in both cylinder and dial and the movements of the pattern wheels.

The cylinder and dial cam races are subdivided into segments which correspond with the knitting feeds and can be removed easily. The dial is set out with two kinds of needles, while the cylinder is set out with one kind only. The cams at each feed in both the dial and the cylinder can be set to three working positions—knitting, tucking and idling. By means of the SZ control the cams at all feeds in the machine are set simultaneously through the agency of two control rings, while the Seu control enables each cam section setting to be controlled individually. This is done by pre-selecting a lever by means of individual bowden cables, and this lever is then activated by a rotating eccentric.

Stitch length settings on this machine at both the cylinder and the dial are effected by means of set screws situated at both the cylinder and dial feeds. These set screws are equipped with a numbering device so that a particular stitch length can be read off clearly and instantaneously. The height settings of the dial are also indicated by means of a numbered scale.

Each knitting feed on the FK Seuma machine is equipped with a pattern wheel the function of which is to select cylinder needles for knitting and non-knitting at that particular feed, and take selected needles at the same time into the knitting position. The pattern wheel is, of course, set out according to the design, and in the event of a disturbance along the needle line, the pattern wheel is automatically swung away and the machine brought to a standstill. The new Morapid pattern wheels can be set out for recurring designs within minutes by means of a scanning attachment or by using stencils. The stop motions are fully electric and work instantaneously.

Stop Motions

Needle detectors scan the needles for closed latches and loading up. These may be fitted as required at any feed. There are stop motions which act in the event of thread breakages and yarn drag, and work in conjunction with the yarn tensions. Signal lamps of varying color indicate the kind of disturbance which caused the machine to stop.

New types of patented yarn feed wheels ensure that the yarn runs smoothly from the yarn package to the needles. These feed wheels are also fully effective when knitting fabrics in color jacquard.

The machine can be used for outerwear as well as underwear fabrics and is available in the following cuts: 10, 12, 14, 16, and 18 needles per inch. There are 24 knitting feeds, and the cylinder has a diameter of 30 inches.

Sweater-Strip Unit

The Morat FKT Seuma circular machine is the more versatile, as well as the more advanced, of the two models. This model, too, has 24 knitting feeds and can be used both for knitting jacquard fabric in the roll as well as garment lengths complete with welt and draw thread. The machine can also be used for knitting rib ends in 1 x 1 rib with tubular welt and draw thread. Jacquard designs in color as well as in raised or tuck stitch designs can be produced, and these designs can be further extended by a combination of the three possibilities mentioned above.

The use of electro magnetic control devices for controlling the setting of the dial cams, the movement of the pattern wheels, and the knitting of the firm start and draw thread, put the machine among the most advanced of its kind. The electromagnetic control requires only a minimum of movable parts, and there is very little wear and tear. The control movements are initiated by a pattern chain complete with reduction attachment and transmitted by electrical contacts to the various elements.

The method of transmission makes it possible for movements to be transmitted instantaneously and is almost completely foolproof. The electromagnetic control also considerably enlarges the patterning scope of the machine since it permits a multiplicity of machine changes.

The 24 dial and cylinder cam sections and also the draw thread cam section fitted to the dial cam plate can be changed in their settings during one revolution of the machine, either singly or in groups.

The cylinder cam sections can be set to three positions—for idling, tucking or knitting.

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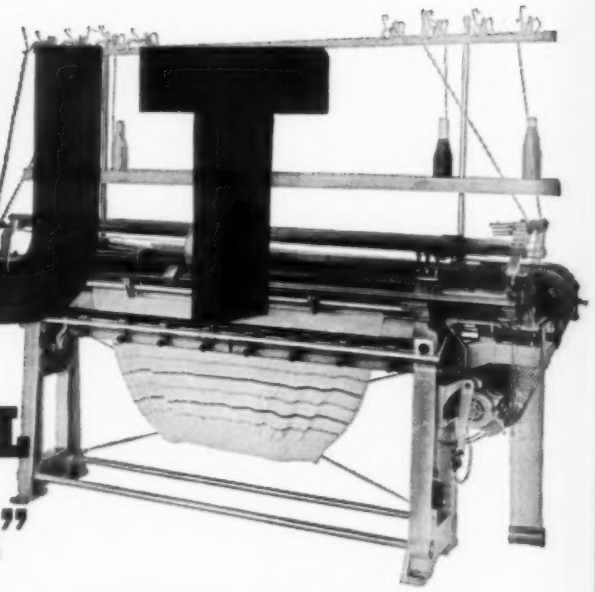

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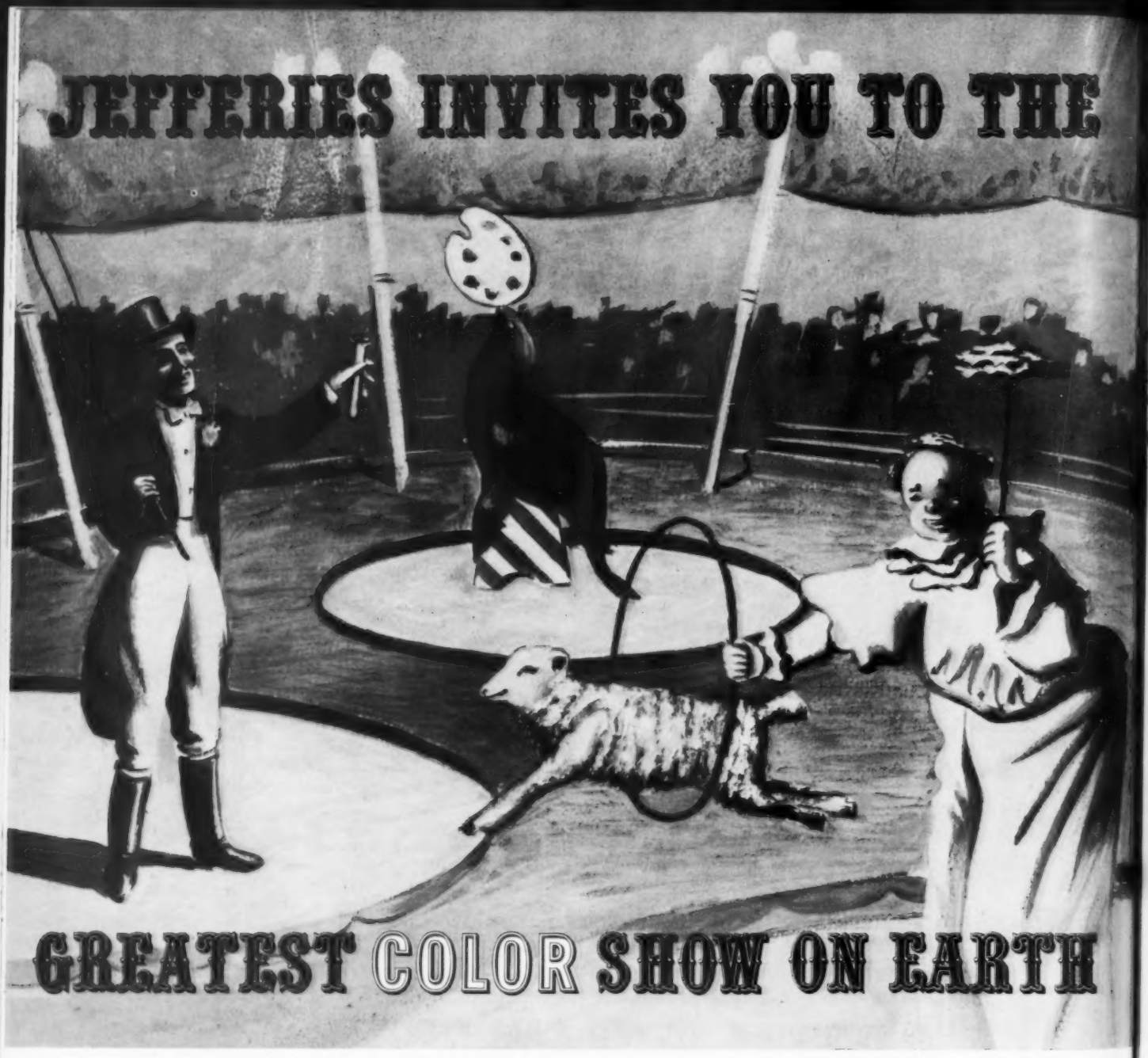

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KAE Equipment Developments

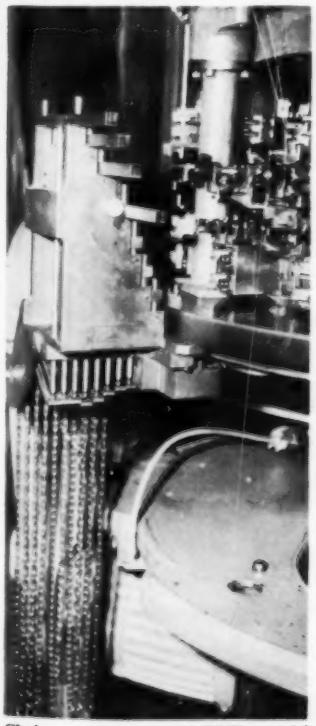
Philip Multi-Purpose Sweater-Strip Machine To Bow

A NEW Philip cylinder and dial sweater-strip machine claimed to be the ultimate in multi-purpose knitting machinery will have its initial demonstration at the Knitting Arts Exposition in the booth of Jet Age Knitwear Machinery Corp., distributors of Philip knitting equipment. The machine is described by its developer, Morris Philip, the well-known knitting machinery inventor, as combining features heretofore unattainable in a single sweater-strip machine. The demonstration model which will be on view in Atlantic City is a 30-inch diameter, 20-feed four-cut machine. The unit, however, will be produced on a commercial basis in from 20 to 24-feeds and from four to 12 needles per inch in cylinder and dial.

The machine is equipped with short and long needles, each with a high and low butt and in addition a special pattern wheel butt on the cylinder needles. The cylinder is constructed with three raceways. In the top channel the needles are under the influence of the pattern wheels. The center channel actuates the short needles and the bottom channel the long needles.

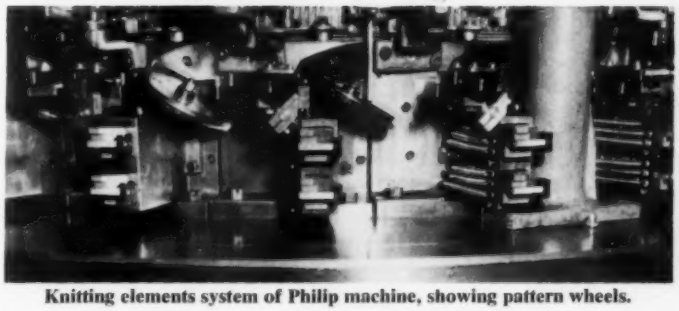
Of the 20 feeds in the four-cut version, 16 are knitting feeds and two are used for transfer from cylinder to dial and dial to cylinder, and the other two are for separation. If the transfer mechanism is not employed, all 20 feeds, of course, can be used for regular knitting. Each feed on the machine is exactly alike and a single drum with nine chains is employed to initiate the machine functions as outlined below:

- First chain operates counter.
- Second chain controls long needles in cylinder.
- Third chain controls short needles in cylinder.
- Fourth chain influences the spring cams which continuously put the machine into the tuck and knit, welt and knit, welt and tuck and tuck positions, producing half-cardigan.
- Fifth chain operates scissors to cut end of yarn in rib cuff knitting.
- Sixth chain controls the stitch tighteners. These have four settings on cylinder and dial.
- Seventh chain controls rack at different heights for the selection of different types of racking desired.
- Eighth chain controls short dial needles.
- Ninth chain controls long dial needles.



Chain system on new Philip multi-purpose sweater-strip machine.

Each of the feeds are equipped with pattern wheels which operate on a multiplier principle. This is actually the key to the machine's vast stitch potentialities. Basis of the multiplier is that the pattern wheel is cut somewhat differently from a conventional wheel. On a normal 16-cut pattern wheel all slots would be even. On the Philip machine the slots are divided into four evenly cut groups designated as A, B, C and D, and at one point on the wheel the spacing instead of being 4/16ths of an inch in width is actually 5/16ths of an inch. Thus, at the first revolution all needles in the A group are under the control of the pattern wheel and the others are neutral.



Knitting elements system of Philip machine, showing pattern wheels.

When the space in the pattern wheel measuring 5/16ths of an inch is reached the needles in B, C, D and A position are skirted without action and the wheel goes to the B group of needles until this revolution is completed. At the next revolution the C, D, A and B group needles are skirted and then needles in the C group become operative, etc.

Another outstanding feature of the machine is double transfer from cylinder to dial and from dial to cylinder. On a 20-section machine, for example, one section controls knitting on the cylinder; the next section transfers knitting from cylinder to dial; the third section knitting on the dial; and the fourth section transferring from dial to cylinder. This mechanical technique permits the knitting of links and links structures on the new Philip machine.

One of the machine's outstanding features is its capacity to rack any one or a desired group of needles on each knitting feed. The racking principle is a unique one and represents a significant departure from the conventional means by which racking is accomplished on circular or flat-bed knitting machinery. Up to now, racking of these machines has been possible only by displacement of one needlebed or housing in relation to its opposed needlebed or housing. In a circular knitting machine such racking has been far more restrictive than on a V-bed flat machine. The racking principle incorporated on the new Philip machine is based on the utilization of a steel flexer next to each needle in both the cylinder and dial. A presser action of the flexer on the adjacent needle serves to position the latter to the right or left side of its slot. Actually the flexer is so constructed that it can adjust the needle by means of different cuts in its wing element to four different positions.

Because of this ability to rack individual needles, the machine possesses virtually unlimited racking scope and can produce a sweater-strip with a fully racked 2 x 2 rib bottom and the body section of the sweater-length embodying different racked panels, in between which is a diamond design on a racked background. Other designs in jacquard shapes which are producible include diagonals, geometrics and similar effects.

In addition to a wide variety of rib jacquard patterns in two, three and four colors, the machine can also turn out the same type of knoppen structures producible on V-bed flat machines,

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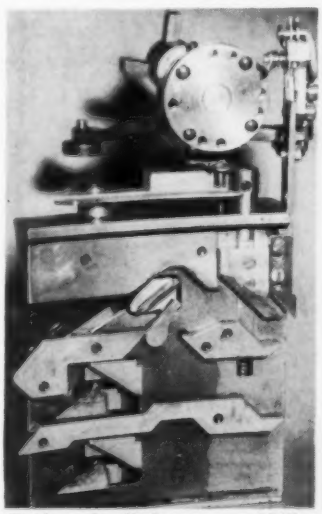

Section of cylinder cam on Philip machine.

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59-1

Knitting Equipment Review

Developments In V-Bed Flat Latch Needle Machines

By RALPH INNES

DEVELOPMENTS in the field of V-bed flat bar machines can be summarized under three headings: (1) A steady increase in the pattern potentialities on these machines; (2) greater automation either by electrical or mechanical means, or a combination of the two; and (3) an increase in end-use versatility. There has been little direct advance with regard to an increase in the knitting speed on these machines, although indirectly either through increased automaticity or other means, it has been possible to increase the general productivity of the V-bed machine.

This inability to do very much in the direction of improving the actual speed of loop forming is not really surprising, if one remembers that on the V-bed flat bar machine loop forming is an intermittent process where in every course the cam carriage is moved from rest across the needlebeds coming to rest again at the completion of its traverse.

These cam carriages due to the increase in pattern potentialities and further automation have not only become more complicated in the process but are also very much heavier than formerly, thus the driving of this heavy mass of metal from rest at every course really precludes any spectacular advances in carriage speeds.

V-bed flat bar machines are among those rare groups of machines where the hand operated machine has not become obsolete or extinct, but on the contrary is being constantly developed alongside the power operated machine.

Hand Machines

A new hand operated V-bed machine which has recently made its debut in Europe is the NHF-4 machine. The machine is available in a variety of needlebed widths ranging from 31½, 39¼ to 47¼ inches and a wide range of cut. The latter extend from 2½ needles per inch on to 3, 3½, 4, 4½, 5, 6, 7, 8, 10, 12, 14, 16 needles per inch.

The two needlebeds are set out with high and low butt needles and the normal security springs. The front needlebed can be lowered in order to inspect the knitting, while the rear needlebed has a six needle rack in cuts between 4½-16 and a four needle rack on the coarser gauge machines ranging from 2½-4 needles per inch. Half needle racks are available on the 4½-16 needles per inch range of machines.

The elongated carriage runs on ball bearings and has a large bow. The carriage is operated across the needlebeds by means of two handles fixed to the carriage extension.

The simple single system carriage has split clearing cams for tucking in the hook and spring loaded needle raising cams for automatic tubular knitting.

On 6 to 16 cut machines auxiliary stitch cams are fitted in the front for synchronized or delayed timing. A drum facilitates a stitch length change over three positions. There are four independent yarn carriers arranged on two bars suspended above the needlebeds, and carriers can be changed at will either on the right hand or left hand side of the machine, thus permitting the knitting of horizontal stripes with color changes at odd courses.

There is a three figure course counter and the four yarn tensions are fitted with a graduated yarn clip for changing the amount of tension required.

The machine can be delivered with plating feeds complete with additional yarn springs, an attachment for knitting laid-in fabrics, a fifth yarn carrier and for machines with needlebeds of 31½ inches in width up to 39¼ inches balance lever drives can be supplied. Further optional equipment includes a widening appliance and if necessary the machine can be equipped with an electric motor.

An interesting development in hand-operated flat machine field is the motorized hand machine marketed under the trade name of Sit-Nit. By motorizing a hand flat bar machine, it is possible to combine the advantages derived from the hand-operated machine, principally shaping by means of loop transfer at the selvedges, with the higher productivity gained from the power machine.

The machine can be supplied with and without motor and with and without an adjustable fabric take-up. There is a seat which runs on rails and whose height can be adjusted to suit individual requirements. This arrangement enables the operator to move to that part of the machine where he or she is required to work; that is, widening and narrowing, changing the stroke of the carriage, etc.

By means of a pre-selector counter, the number of courses to be knitted can be set, so that the machine stops automatically when the number of courses required has been knitted. The machine can be started by means of a button control, but during knitting, the operator can stop and start the machine by means of a foot pedal which runs the entire length of the machine. In this way the operator has both hands free for narrowing or widening and in cases of emergency, there is a small cord fitted at the front of the machine which stops the machine instantaneously.

By means of a switch, the carriage is stopped on the left side of the needle field for stitch transfer work.

The take-up rollers are covered with special rubber and are adjustable by means of a spring. They work in conjunction with a set of counter pressure rollers which can be adjusted individually and can be instantaneously released by means of a lever.

There is an electrical stop motion which operates in the event of yarn breakages, knots and empty bobbins.

For knitting samples, the DUT hand jacquard machine is available in four different needlebed widths ranging from 27½ to 39¼ inches and in a range of cuts, starting at four needles per inch to 14 needles per inch.

The two needlebeds are set out with high and low butt needles complete with springs, clavettes and selectors. The front bed can be lowered for inspection purposes and it also has a rack over six needles. The short high bow carriage runs on ball bearings and there is an adjustable elliptical handle. There is a top cam system in the carriage for knitting on the needle butts with split clearing cams for tucking in the hook and for knitting tubular. The lower front cam system for the needle springs is used for controlling the bird's eye selection. The lower cam system in the rear is used for controlling the jacquard clavettes.

There are four yarn carriers which can either be controlled by hand through a touch plunger or automatically by means of a

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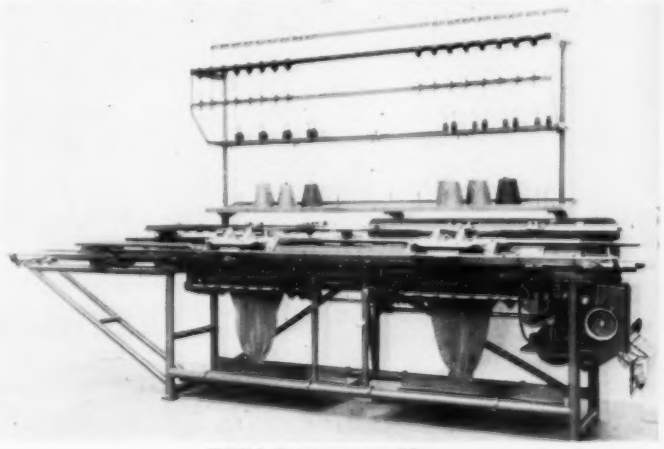

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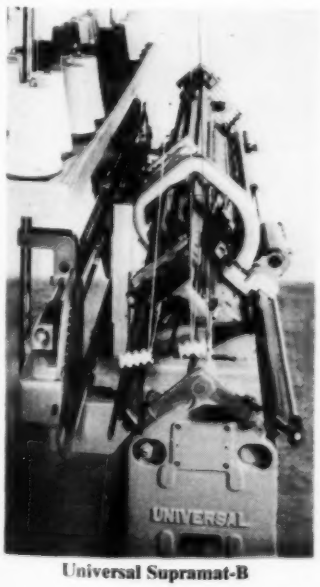
perforated paper band. The yarn carriers can be changed as required, either on the left or right hand side of the machine. The steel jacquard cards rest on a prism which can be racked at each course either forward or backward, or it can remain stationary. The setting can be controlled either by a hand lever or automatically by the same perforated paper band which is used for the striper. There is also a course counter with an instantaneous return to zero. The machine can also be adapted for knitting two pieces at once or even more than two. The jacquard cards can be punched to the customer requirements.

A useful device for hand flat bar knitters has recently been marketed in Switzerland. The mechanism permits rapid widening without the necessity to dirty one's hands by pushing the needles up into action by their springs. The appliance can be fitted to all hand machines which do not use a jacquard and is particularly useful when knitting shaped sleeves where frequent widening is used throughout the garment.

A new intarsia machine with one needlebed 35 inches in width and available in cuts of 7, 8, 10, and 12 needles per inch can be used for the production of single bed fabrics with designs in solid color. There are two yarn carriers and for intarsia designs the colored yarns are fed to the needles by hand. The cam carriage for knitting on one bed only is fitted with cardigan cams for tucking in the hook. The change of the yarn carriers is effected by means of a piston and holding down sinkers prevent the fabric from riding with the needles. An indicator which assists in the knitting of intarsia designs can be supplied on demand.



Universal Supramat-B

Finally, to round off the hand machine section of this survey is an interesting model which has recently been developed in Italy. The machine is available in three models, Export, Exfam and Extab which are all designed to combine simplicity of machine design with the ability to knit on a bulk production basis. The short carriage slides on ball bearings in four exchangeable nylon guides. These are self-lubricating and there is very little wear. The back bed of the machine is fitted with a half shog attachment, which permits the needlebed to be moved over half a needle space.

The micro stitch length adjustment permits very sensitive stitch length adjustments and a special patented attachment permits very accurate alignment of the individual cams so that all possible differences in cam settings have been eliminated.

Optional extras which can be supplied with this machine for use on all three models, include a stitch transfer attachment, a patterning attachment for producing jacquard type designs and the "Veloras attachment" for knitting fabrics with particularly small loops. The Export model is available in cuts ranging from 5-14, and is fitted with a very simple cam carriage and two yarn carriers. The Exfam model is equipped with a cam carriage which includes cardigan cams for tucking in the hook, while the Extab model has high and low butt needles and cardigan cams.

Power Machines

A very interesting power flat bar machine for knitting Basque berets has been developed in France. The machine, model TB 57, produces these headpieces with jacquard designs. The very simple cam system consists of stitch cams only which have micrometer adjustments for regulating the stitch length. The normal needle raising cams have been replaced by a selector prism. This is a light metal drum which has grooved flanges into which U-shaped selector rods can be inserted. The top side of these rods contain holes which correspond to the needles in the machine. These holes can be covered according to the design by means of small cover plates. A cover plate causes the particular needle to go into action, while an uncovered hole in the selector rail results in the respective needle remaining idle.

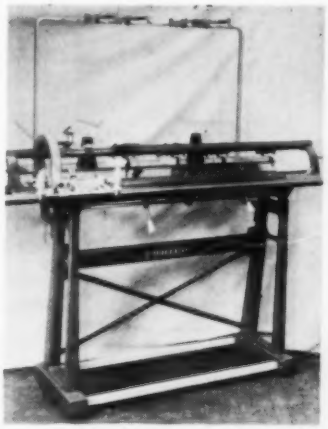
The selector prism moves backward and forward in each course and one complete revolution of the prism finishes one section of the beret. There is also a three-color striper so that jacquard and striping effects can be combined. The machine is available in the following cuts, 6½ needles per inch, 9 npi and 12 npi. It can knit 80 courses per minute of jacquard fabric.

Stoles and trimmings for all kinds of knitted outerwear are traditionally knitted on narrow V-bed flat bar machines. These so-called strapping machines are eminently suitable for knitting these narrow strips of fabric. From Germany comes a new type of strapping machine which has a number of interesting new features. The Model RB machine has two knitting speeds and, if required, the machine can be fitted with an infinitely variable speed regulator disc.

The required knitting width can be adjusted by altering the radius of the driving crank. The fabric take-up is fully automatic and is driven by means of a lift eccentric which can be altered with regard to the extent of the lift by means of a set screw. The battery of counter pressure rollers is individually adjustable. The knitted fabric slides down the chute into a fabric-receptacle.

An RBV model in the same range is fitted with an interesting needlebed shog attachment. The needlebed can be racked at single or two course intervals and the whole attachment is actuated by the lift eccentric.

A more elaborate strapping machine is the KAMO/J machine, fully automatic unit. It is designed for the production of strapping in color jacquard. A pattern chain which is racked coursewise at each completion of the carriage traverse, and which carries exchangeable racking studs, supervises the needlebed rack mechanism as well as the carrier changes. The carriage is given very precise movements by means of eight built-in roller bearings.


Dubied NHF/4 machine.

By suitable support of the heavy carriage driving chain, the machine works with a minimum of noise and there is no knocking as the carriage reverses its stroke.

Like most modern machines of this type, this unit is amply equipped with yarn tensions while the fabric take-up consists of the conventional fabric roller and a battery of counter pressure rollers which may be swung away from the main roller collectively.

There are electric stop motions which act in the event of yarn breakages, empty cones, and knots in the yarn.

The stitch length can be adjusted to very fine limits by means of setting scales on the cam plate of the machine. The jacquard and cardigan cams have exchangeable parts.

The machine can knit 1 x 1 rib and 2 x 2 rib cardigan and half cardigan, single and double-sided jacquard with and without bird's eye backing as well as raised and ripple stitch designs.

The KAMO/J can knit six straps in one color or three straps in two colors or two straps in three colors. Alternatively to knitting these straps which have firm selvedges on both sides, it is possible to knit

(*Continued on Page* 31)

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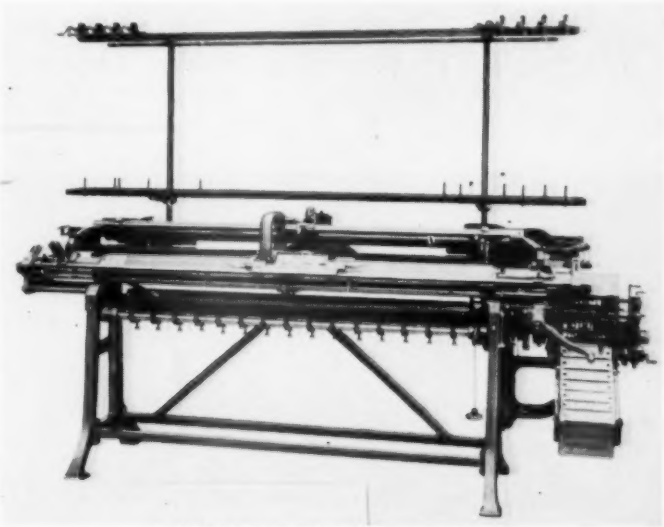
two double straps in two or three colors which are then cut in the center, thus each having one selvedge and one cut edge.

The DRBA power flat bar machine, another recent new V-bed and fully automatic double system machine, is fitted with attachments for widening and stitch transfer.

The needlebeds are set out with high, medium, and low butt needles. The high butt needles are used for widening, while the medium and low butt needles are used for stitch transfer. The front bed of the machine can be let down for inspection purposes and the back bed has a shog which can either operate as a single needle rack over three needles or as a double needle rack over four needles. There is also the half needle rack for facilitating the transfer of stitches from one bed to the other.

The twin system cam boxes are combined knitting and stitch transfer cams and this reduces the length of the cam plate in the carriage as well as the carriage stroke considerably. Since the machine speed has to be reduced for stitch transfer, the machine is fitted with a two speed motor. It is possible on this machine to knit with the medium and low butt needles either together or separately and this holds good for stitch transfer also. This makes it possible to knit eightlock type designs on one side of the fabric.

In order to avoid bad selvedges when widening, the carrier stop blocks are adjustable so that there is no need to set the carrier stop blocks for the widest knitting widths right at the start when the long free float of yarn often causes looping at the selvedge as the carrier returns for the next course. The adjustment is automatic and permits the special yarn carriers to have a short stroke when the knitting is over a narrow length, which becomes a long stroke when the width of knitting has exceeded a certain length. It is quite easy to put one of the two heads out of action if this is required. The machine is available in cuts ranging from 4½ to 14 and has a knitting speed, depending on cut of 43 carriage traverses per minute to 38 carriage traverses per minute. The DRBA is suitable for knitting sleeves and



JBOM/b automatic flat power machine.

garment parts and single bed fabrics with a rib bottom.

Another German fully automatic twin system power flat bar machine with widening attachment is the DOFMO/Z machine. The drive of the machine is built into the right hand stand of the machine and the cleanliness of the machine is much improved by the fact that nearly all moving parts are fully enclosed. All machine changes are initiated by the pasteboard card mechanism and the heavy carriage is driven from a fully supported chain which with the displaceable carriage plunger is arranged in such a way that a trouble free drive is guaranteed. The cam carriage is partly made from light metal and has ground carriage guides, thereby reducing frictional resistance considerably. The take-up mechanism is of the normal type. It consists of a take-up roller and a battery of springloaded counter pressure rollers which can be swung away simultaneously from the take-up position. The cam plates in the carriage can be lifted out individually and the machine can be stopped either through the paste board card mechanism or through the stop motions which act in the event of needle and yarn breakages, empty cones and knots in the yarn.

In addition to facilitating an automatic change from 2 x 2 rib to 1 x 1 rib the cam system also has a part which permits automatic widening and a press-off part which permits pressing-off in two steps, adjustable as needed.

Widened parts can be knitted on 1 x 1 rib, half tubular, tubular as well as half and full cardigan, either with all needles in action or with a part needle set out. The back bed can be shogged over two needles either in single needle or two needle steps and there is also the half needle shog. There are six yarn carriers and by putting the widening mechanism out of action the machine can be used for general production purposes. The machine can knit draw threads and a splicing attachment is optional.

A single system machine which is popular on the European Continent is the JBOM/b machine. Again all mechanical changes on the machine are initiated by the paste board card mechanism. The changes include those necessary for the pattern as well as the draw thread welt, etc. The chain driving the carriage is fully supported and the carriage driving plunger is displaceable. The chain rests on prismatic guides and, together with the chain protectors, these ensure a safe smooth movement of the carriage with a shock-free reversal of the carriage stroke. The machine has a knitting width of 64 inches and is available in cuts ranging from 3½ npi to 16 npi.

Machine changes can be carried out automatically at either end of the carriage traverse. The carriage itself runs on roller bearings and can be lifted out of the machine without difficulty. The cam system includes cams for automatic tubular as well as for tucking in the hook. High and low butt needles facilitate an automatic change from 2 x 2 rib to 1 x 1 rib as well as very many patterning effects. There are automatic changes for four different stitch lengths and the slides for facilitating these changes are fitted with brakes in order to ensure accurate settings.

Large, semi-circular scales permit very fine settings of the stitch length.

The coarse gauge machines up to five npi have a four needle rack of the back bed, which can be shogged either one or two needles at a time and the finer gauge machines have a six needle rack. There is also a half needle rack for use when knitting selection 1 x 1 rib (on alternate needles only).

An economizer disc can save up to 90 per cent in pasteboard cards. There are four yarn carriers and carriers can be changed at single course intervals automatically. At the same time needlebed racks can be effected at single course or two course intervals. Electric stop motions stop the machine in the event of yarn breakage, knots, empty bobbins, needle breakage and load ups.

Still another fully automatic stitch transfer machine is the DJFU equipped jacquard attachment. This twin system machine has a knitting width of 63 inches and is available in cuts ranging from 5 npi to 16 npi. The DJFU machine has high and low butt needles and stitches can be transferred from the front to the back bed or vice versa. All needles can transfer their loops or the low butt needles and high butt needles can transfer their loops separately.

The change from 2 x 2 rib to 1 x 1 rib is fully automatic. The front bed can be racked over six needles in any desired step. There is a jacquard attachment on both the front and the back bed and the jacquard prisms can be moved forward or backward over one or two cards. The single bow carriage gives easy access to the cams. Each group of cams is controlled by its own individual slides which can be moved either automatically or by hand.

(*Continued on Page* 33)

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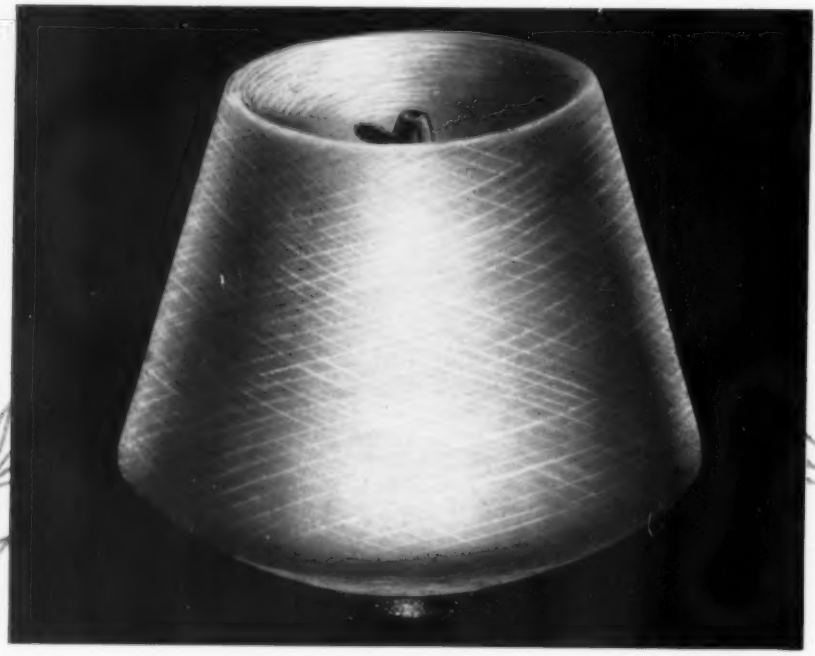

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The needlebeds have exchangeable tricks and each needle has three tiers of selectors —one for each range of cams and one for the transfer stitch attachment. The stitch-length can be adjusted by means of five micrometer screws to five different positions.

There are eight yarn carriers and 18 yarn tensions and the carriage can be lifted out of the machine easily anywhere in the knitting area and outside it. The paste board card control mechanism deals with nearly 90 different functions which can be made effective at single course intervals and an economizer can be made effective at single course intervals and an economizer disc helps to shorten the pasteboard card chain considerably.

The fabric take-up can be adjusted by means of a handwheel and the spring loaded sectional counter pressure rollers can be swung out of action collectively.

The machine is driven by means of a two speed motor and the speed of the carriage can be altered steplessly by means of a V belt pulley. The heavy roller chain driving the carriage is supported on large diameter sprocket wheels and there is no knocking when the carriage reverses its stroke. A hole in the pasteboard card controls the slow down of the carriage to the lower speed by means of a disc clutch.

The machine can be stopped either by means of a hole in the pasteboard or by the pre-setting of a piece counter.

Stop motions acting in the event of yarn breakages, empty yarns, large knots in the yarn, overloading heavy carriage movements, etc., stop the machine at once. A signal light indicates the cause of the stoppage.

The machine permits knitting and stitch transfer during the same stroke of the carriage without a reduction in speed. Transfer can also be effected on empty needles, thus permitting purl stitch designs. Widening and narrowing can be effected by means of the jacquard attachment.

A relative newcomer in the flat bar machine field is Supramat SF machine, available in cuts ranging from 4 to 14. The machine is distinguished by its simple construction and easy accessibility to all parts. It can be used for the manufacture of garment parts for outerwear or 1 x 1 and 2 x 2 rib ends with welt and draw threads.

All functions on the machine are initiated automatically by studs on the main chain. The back bed can be racked at single or two course intervals over the number of needles comprising the cut.

The machine has four yarn carriers which can be changed at two course intervals, and in any desired order. The stitch length can be altered automatically at two-course intervals over three settings by means of a slide arrangement. Slack courses for looping can also be made. The cams can knit automatic tubular and can tuck in the hook.

The control of the needle raising cams is fully automatic through a 48 course pattern drum which is set out with pattern jacks. These drums on the front and the rear of the cam carriage can be racked backwards and forward and control in addition to the needle raising cams, also all other cams in the cam box. The high bow carriage can be used for knitting various pieces at once. The machine uses high and low butt plate needles and there is an economizer which can save a considerable amount of chain links.

Finishing Equipment

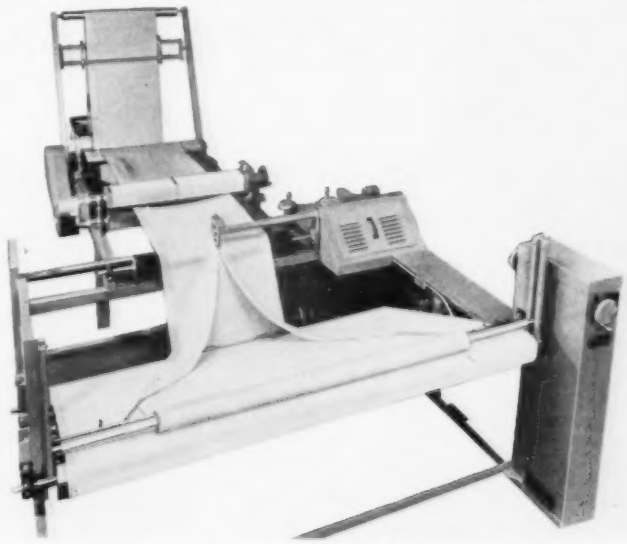
Tube-Tex Tensionless Open Width Finishing Machine

THE Tube-Tex tensionless open width finisher combines the principle of the company's tensionless framer and steamer with a new Tube-Tex method of slitting and opening circular knitted yardgoods. The machine was developed both for plain jersey (single needle) and the new popular double knit cloth, permitting two types of knitted fabric to be completely finished and delivered in the open width ready for the cutting table. A further important use for this machine is to prepare circular knit yardgoods for foam laminating.

The machine employs the Tube-Tex patented propeller spreading mechanism, which acts as a spreader conveyor and is designed to support and carry the cloth while it is extended to its finished width through steam. Since this spreader is driven throughout its length, which covers a distance of approximately 4½ feet, there is controlled propulsion of the fabric and no calenders or finish rolls are needed. This has the advantage of steam finishing the knitted tubing without pressing or setting an edge crease in the material that would later show up on the cutting table as an objectional mark or line.

When the machine is used for double knits, cloth knitted from dyed yarns can be taken directly from the knitting machine and relax-steamed in tandem with the slitting and opening treatment. If decating is to follow, a uniform roll then would be available to be transferred to the decating machine.

The slitting and opening section, which is of the center-slit type, has a number of innovations. The most important of these is that the fabric is supported by a conveyor practically throughout the entire time it moves through the machine. The ability to carry the cloth, while it is being processed, not only helps maintain uniform fabric width without resultant loss of width, but through the tension-free system practically eliminates any curling of the fabric edge that would normally result if the fabric were pulled.



Tube-Tex slitting machine.

A further important advantage of the conveying system of slitting and opening is that it reduces any tendency of fabric distortion developing and a wavy or uneven appearance across the width of the material.

The slitting and opening section is currently manufactured in a basic model with an operating width of from 40-inch tubular to 80-inch flat and opened. The spreader on this equipment is adjustable.

The design of the machine is such that the slitting and opening section can be delivered as a separate machine or existing slitters and openers of this type that have been manufactured by Tube-Tex can at some future date be adapted to receiving the spreading, steaming and opening section.

Knitting Equipment Review

New Developments In Tricot And Raschel Machinery

By A. REISFELD
Director, Research and Development
Gehring Textiles, Inc.

ONCE again we are on the eve of the Atlantic City Exhibition—the traditional forum of the warp knitting industry. On this occasion it would perhaps be fitting to indulge briefly in retrospection and take stock of the progress in both the tricot and Raschel branches. Indeed, much has been accomplished in the way of performance, pattern scope, maintenance and operation. The newly introduced machines are capable of greater productivity while incorporating improved pattern, warp and quality mechanism or controls. Beside the developments and improvements in engineering aspects of knitting machines, there is also a modest but very significant improvement in their prices. Recently offered equipment, although faster and more refined, carries a lower price tag.

The trend towards more realistic pricing of machinery will probably continue especially in view of the emergence of East Germany as a potential competitor. There, the machine building skill left behind the Iron Curtain finally reasserted iself and is now a factor to be reckoned with. Within a short time, the East German technicians and craftsmen were able to evolve a number of new models of appreciable merit. These will be described later on in this article.

Tricot Developments

The machine elements around which most of the tricot developments are taking place are: (1) camshaft assembly and means of imparting movement to knitting element bars; (2) let-off motion; (3) guide bar assembly and its mode of operation; and (4) sinker bar control for pillar chaining.

CAMSHAFT ASSEMBLY — The cams whether of conventional or contour form have now been supplanted almost in all cases by eccentrics or crank drives. The contour and cam and counter-cam arrangement was very convenient since it enabled generating any type of movement the machine builders thought best for the knitting action. However, the great disadvantage of these cams was unduly high inertia value produced upon exceeding speeds of 600-700 courses per minute. This inertia imposes a heavy load on all moving bars and linkages causing wear, vibration, noise and adversely affecting the loop forming process.

In order to lessen inertia stresses and so attain higher speeds, the machine builders resorted to cranks and eccentrics as means for driving the knitting element bars. The inertia stress produced by cranks and eccentrics is of much lower order than that of orthodox cams resulting in smooth quiet and almost vibrationless running.

An added advantage of eccentric is their low cost, negligible wear and ease of lubrication. They do, however, require rather complex linkage systems to integrate their movement and transmit it to the knitting element bars. Dynamic balancing of eccentric and linkage assemblies is now generally practiced in order to minimize vibration.

LET-OFF MOTION — Power assisted let-off motion is now standard on all new machines. There are two principal characteristics determining the type of let-off mechanism: (a) Mode of control—mechanical, electrical, hydraulical, etc. and (b) Origin of control — warp speed or its tension.

Some machine builders favor mechanical let-off control, while others utilize electrical devices. The let-off controlling agency is on some machines the warp sheet tension; on others, its linear speed. It has not been established as yet which system is superior. In the author's opinion, the control relying on warp sheet speed is perhaps better suited for knitting of staple fabrics of regular lapping movement like jersey, sharkskin, nets, etc. In such cases, setting the let-off at a uniform warp sheet delivery produces consistent results. Should, however, large and sudden variations occur in lapping movement repeat, e.g. single needle inlay followed by seven needle inlay, the let-off mechanism may not be able to take compensating action fast enough to accelerate the warp delivery and satisfy the abruptly increased demand.

Let-offs governed by warp sheet tension are better equipped to cope with irregular movement since the tension increase signal accompanying longer guide bar shog may be communicated to let-off faster and more directly than increase in warp velocity.

The let-off applies variable speed drive to the beam assembly through opposed cone or hemisphere transmission, hydraulic servomotors, multiple disc clutches, etc. Operation of transmission is governed by the let-off control mechanism consisting of such devices as epicyclic or planetary train of gears, oscillating pawl and ratchet arrangement, microswitches and electromagnetic couplings. These compare the tension or speed signal relayed to them from the warp with a preset value and, if necessary, take corrective action by varying the warp delivery until status quo is restored. Considerable progress has been made in improving the let-off efficiency and capacity to maintain correct runners throughout the entire warp. With the beam diameters increased up to 32 inches, it is essential to have the let-off function consistently from start to end, otherwise, one beam will run out hundreds of yards ahead of the other resulting in costly waste.

Drifting runners in addition to warp waste will also cause variation in yield, stitch definition and fabric characteristics.

GUIDE BAR ASSEMBLY AND OPERATION—With the increasing machine speeds, the inertia stress developed in the course of rapid guide bar oscillations induces a whip effect which tends to modify the guide timing in relation to the needle movement. In order to stabilize the guide bars, a greater number of suspension hangers is now being used. Thus, on the new 84 inch Liba "Excentra" there are as many as six hangers. The guide bars slide in ball bearings which require no lubrication. This is an important point since presence of lubricant so close to the warp, has always been a source of soiling problem.

On one model there is also a torsion stabilizing bar connecting tops of all hangers. Unfortunately, all extra hangers and bars obstruct access to the guides as to make the task of thread replacement more difficult. The swinging movement of the guide bars lately received a good deal of attention. This is understandable in view of limitation on speed imposed by the inertia effect. The machine designers' endeavors to reduce or even eliminate the swing have been successful. The Reading machine has a shortened arc of swing in conjunction with modified needle movement, while the Wirth's Favorit features a swingless guide bar assembly and figure of "8" needle movement. In addition to kinetic considerations of reduced guide swing, there is also an important advantage from the standpoint of knitting efficiency on account of lesser abrasion and filamentation of yarn, particularly of unthrown type.

The oscillatory guide bar movement on the F.N.F. machine has been modified to enable marquisette style pillar chaining over a large number of consecutive courses without the aid of special sinkers. This is accomplished by imparting to the guide bars two complete swing cycles for every needle bar motion during which the guides execute a so-called sinker lap holding down the pillar chains and so obviating their rising with the needle stems. Mayer had introduced novel shape guides with blades bent at right angles in the warp direction. It is claimed that such a guide helps to separate the ends and prevent them from clottering which is a major cause of yarn failure at the needle bar level.

A novel way of lapping the needles with yarn has been evolved by the Shirley Institute in England on a small prototype. The guide bars do not make the

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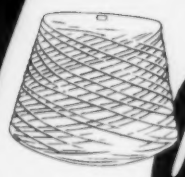

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Warp Knitting Equipment

Features Of Karl Mayer Rotary-Rapid Tricot Machine

WHILE the maintenance of high running speed ranks as of paramount importance in warp knitting, the balance of emphasis at the present time inclines towards factors that promote maximum operating efficiency, having due regard to low fault rate and minimum upkeep charges. The design of the new Karl Mayer Rotary-Rapid machine, successor to the Super-Rapid, shows a definite trend towards precision engineering. Its construction is based on the principle that stability, more closely correlated with balance than with weight, is of greater importance than rigidity. It has two feet which rest on spring supports to absorb vibration and it can be swung on these supports without adverse effect on the knitting action.

It is a feature of the general design of the Rotary-Rapid machine that it can incorporate up to four guide bars but insofar as relevant points of detail are dealt with in this article they refer specifically to models equipped with two guide bars These two-bar machines are offered in seven different needlebeds ranging from 84 to 180 inches in width and in gauges between 21 and 32 needles per inch. One of its new parts is a trick plate to hold the needles which are no longer cast into leads. It is submitted that there is always a potential margin of error in the spacing of cast needles and that accurate casting is the exception rather than the rule, especially when done by the fabric manufacturer.

Experience has proved that the plastic needle holders introduced by Karl Mayer a few years ago, though better than leads in some ways, tend to give more needle play than is desirable. In the needlebed of latest construction use has been made of the wide experience gained by machine builders in producing fine gauge machines for the manufacture of full-fashioned stockings; the needles have flattened cranked stems, fit into holes in the needlebed, and are supported along more than half their total length, as compared with one-third in the case of leaded needles. An 84-inch needlebed comprises five sections each of which can be separately renewed as and when necessary. The new needlebed is much more expensive to produce than the earlier types but needle replacement costs are substantially lower and less plier-ing is required. The individually mounted bearded needles are held in the needlebed by means of detachable plates. Each plate is three inches wide and can be removed and replaced easily and quickly from the front of the machine.

The thread guides, chromium plated and cast into leads one inch wide, are specially shaped to minimize the drag between the yarn and the edges of the guide eyes so that the guides will last longer, especially when filament yarns delustered with titanium dioxide are being used. A bend in the guide gives support to the yarn before it goes through the eye in the direction from right to left on its passage to the knitting needles.

By shortening and reshaping the sinker belly and fastening the sinkers together with less lead at their forward ends than is normally used a more compact construction has been obtained and the weight of the sinker bar has been reduced. Spring washers are fitted to prevent the sinker leads from rising when heavy fabrics are being made.

The needlebed has an arcuate movement to give vertical displacement to the needles and the movement, which conforms to the conventional action of bearded needles with rest period during pressing and while overlaps are being made, is obtained through a sleeve and compound lever assembly from an eccentric on the main shaft of the machine. Between the eccentric and the encircling sleeve are roller bearings and in the compound lever assembly there are also roller bearings instead of ordinary bush bearings. It is claimed that the employment of roller bearings in the main drive is a new departure insofar as textile machinery is concerned; they generate minimum heat, are guaranteed for ten years, and obviate the need for any oil pressure systems in the sump of the machine.

Eccentrics and compound lever systems are also responsible for the collective to-and-fro swinging movements of the guide bars, for the backward and forward movements of the sinker bar, and for the backward and forward movements of the presser. Comprising the main shaft of the 84 inch machine are four sections which can be dismantled separately when necessary, although it is also possible to deal with the shaft as one undivided part. In the four sections together there are four eccentrics for driving the needlebed, four for driving the sinker bar, two for swinging the rod from which the guide bare are suspended, and two for operating the presser bar. Each sleeve incorporates its own roller bearing unit. There are also roller bearings for the rocking shafts and since fat is not made fluid and dispersed by heat, regreasing of these bearings is unnecessary more often than about once every six months.

The actual displacements of the loop-forming parts conform to those of the modern Super-Rapid machine, with the needles having a collective vertical displacement of only 14.5 mm. as compared with 16 mm. on machines of earlier design (on pre-war models the displacement was as much as 18.54 mm.). The rest level for pressing is approximately one millimeter below the

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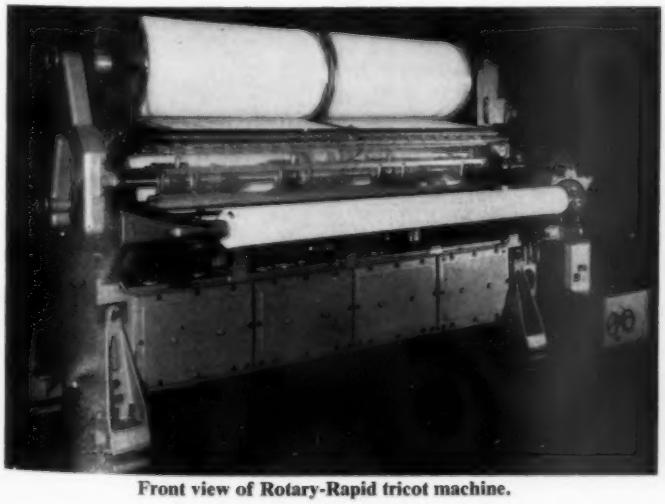

Front view of Rotary-Rapid tricot machine.

Tricked needlebed Rotary-Rapid tricot. Sectional photo removed.

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Knitting Arts Exhibition

Participating Equipment, Supply Firms At Record High

VIRTUALLY every type of equipment and product used in the manufacture of knitted outerwear, full-fashioned and seamless hosiery, half-hose and knitted underwear will be on view at the 45th Knitting Arts Exhibition which opens its doors at noon today in the huge Convention Hall on the Atlantic City boardwalk. Listed below in alphabetical order are the exhibiting firms. Booth numbers are given for each exhibitor followed by products handled, a brief description of the innovations and developments being featured and personnel in attendance. Booths may be readily located by consulting the floor plan on the next two pages. Each exhibitor's area is indicated both by company name and booth number.

Abertoyle Manufacturing Co. (Booth 325) Knitting yarns. Display will be built around knitted and woven garments produced from Abertoyle yarns of Durene, various types of Orlon including Orlon Sayelle, nylon, quarter-blood wools and blends of Dacron and cotton, Kodel and cotton and Zefran and linen.

Personnel in attendance: A. S. Wilson, Jr., president; J. S. Kenrick, senior vice president; E. J. Neal, vice president; H. D. Whitener, vice president; Walter Humecky, Miss M. B. Reid, Miss F. S. Lippincott, R. A. Field, R. E. Broughton, R. F. Morris, K. Frederick, J. J. Neil, Wm. Napier, W. G. Vetterlein, J. P. Boger, David Gott, R. Hasselle, R. Mishell, J. Smith, Harry Whitin, E. Worth.

Ainslie Knitting Machine Co. (Booth 1003) Knitting and general mill equipment. In knitting equipment, the company will display its double head border machine, a string knitting unit and a hand operated V-bed flat machine. Also on exhibition will be the company's brushing machine. The latter has a 60-inch wide brush roller and is designed for raising a nap on knitted fabrics produced from natural or synthetic fibers.

The double head border machine produces narrow rib banding in jersey, rib, half and full cardigan constructions. It is available in conventional cuts and is fitted with a selective racking chain permitting the production of racked and zig-zag borders. The string machine is a circular unit ranging from ¼ inch to ¾ inch cylinder diameter. The ¾ inch unit is equipped with eight needles. Finer cut cylinders in the 14 and 16 needle range are also available. This machine turns out continuous knitted tubing in jersey stitch.

The hand flat knitter is a new unit and is described as a subjacquard type. By this is meant that patterning variety can be achieved without conventional jacquard card arrangement. The patterning arises from the use of three different types of needles in the front needlebed and a fourth type in the rear needlebed. The needle variety actually is a substitute for high and low butt needles. The machine's carriage has selected drums controlling the cam system. In operation, needles can be selected to tuck, knit in any course, or tuck and knit. The stitch possibilities include tubular and knoppen constructions. The machine is available in cuts from 1½ to 14 needles per inch. The needlebed measures 43 inches and has facility for racking over five needles. Two yarn carriers are standard equipment.

Personnel in attendance: Leopold Broadwin, Sampson Broadwin and Alan Broadwin.

Allied Chemical Co. (Booth 219) Synthetic fibers.

American Aniline & Extract Company (Booth 737) Textile chemicals. The exhibit will consist of textile sizes, anti-static yarn lubricants, synthetic detergents, finishing materials for the throwing, knitting and weaving trades.

Personnel in attendance: William J. Duddy, president; R. D. McCarty, vice president; Martin H. Silberman, technical director; Lynn Kippax, sales manager; and James H. Jones, William Franks, Eric Hellstrom, sales representatives.

American Cyanamid Company, Fibers Division (Booth 751) Synthetic fibers. The claimed exceptional dyeing properties of the company's Creslan acrylic fiber will be spotlighted in its exhibit. Focal point of the exhibit will be the Creslan Theater, where the company will present a special Microdyeoscope film illustrating the build-up of dyestuffs on Creslan and other fibers. Dr. Henry E. Millson of Cyanamid's dyes department, who developed the Microdyeoscope technique, will be available daily in the booth to discuss the nine-minute film presentation.

Exhibits in conjunction with the presentation will emphasize the versatility and performance advantages of the Cyanamid fiber, reflecting the many texture effects, yarns and knit fabrics in which Creslan can be offered. On display will be a range of knit products, including sweaters, suits, coats, swimwear and sportswear—many of them featuring new yarns developed through Cyanamid's designer service program. Fabrics to be displayed will include jerseys, double knits, ratine and Raschel knits.

Personnel in attendance: Alden R. Loosli, general manager, fibers division; William H. Kieffer, director of marketing; Martin B. Friedman, manager, merchandising department; James B. McDonald, sales manager; George P. Vescio, manager of apparel merchandising; Walter J. Bartlett, manager, women's and children's wear merchandising; Albert N. Foster, manager, men's and boys' wear merchandising; James E. Ryan, sales manager, New York district; Erwin G. Walker, sales manager, South; Ben W. Wiesen, manager, West Coast sales and merchandising; and John L. Boeing and Walter R. Britland, sales representatives.

American & Efird Mills, Inc. (Booth 625) Knitting yarns. Display will feature knitted dresses, sweaters and knit shirts made from various yarns which the company produces.

Personnel in attendance: T. C. Smotherman, A. N. Thompson, R. J. Freese, F. A. Farnell, T. W. Fulk, R. F. Jessen, S. M. Littlejohn, A. W. Bell, A. T. Dickson.

American Enka Corp. (Booth 86) Synthetic fibers and yarns. Exhibit will be built around a display of Enka nylon and rayon yarns and fibers. The display will include, in addition to ladies' hosiery of Enka nylon and half hose of Ban-Lon processed Enka nylon, knit sport shirts of Ban-Lon Enka nylon and warp knit Enka nylon fabrics in brushed and unbrushed doeskin and suede effects, including foam laminates.

Personnel in attendance: Dr. Frits Prakke, M. Boylan Carr, W. M. Pomeroy, Jr., S. W. Holmes, Jay Kaner, K. J. Martus, H. Z. Heuston, O. E. Herzog, E. W. Martin, C. R. Hall, Don Campbell, Sid Smith, J. B. Steen, Jr. and D. J. Godehn.

(*Continued on Page* 43)

SUGGESTIONS FOR TOURING THE KNITTING ARTS EXHIBITION

1. Don't try to breeze through the show in one day. The man on the run cannot get what he should out of the displays. Allow yourself at least two days, three if possible.

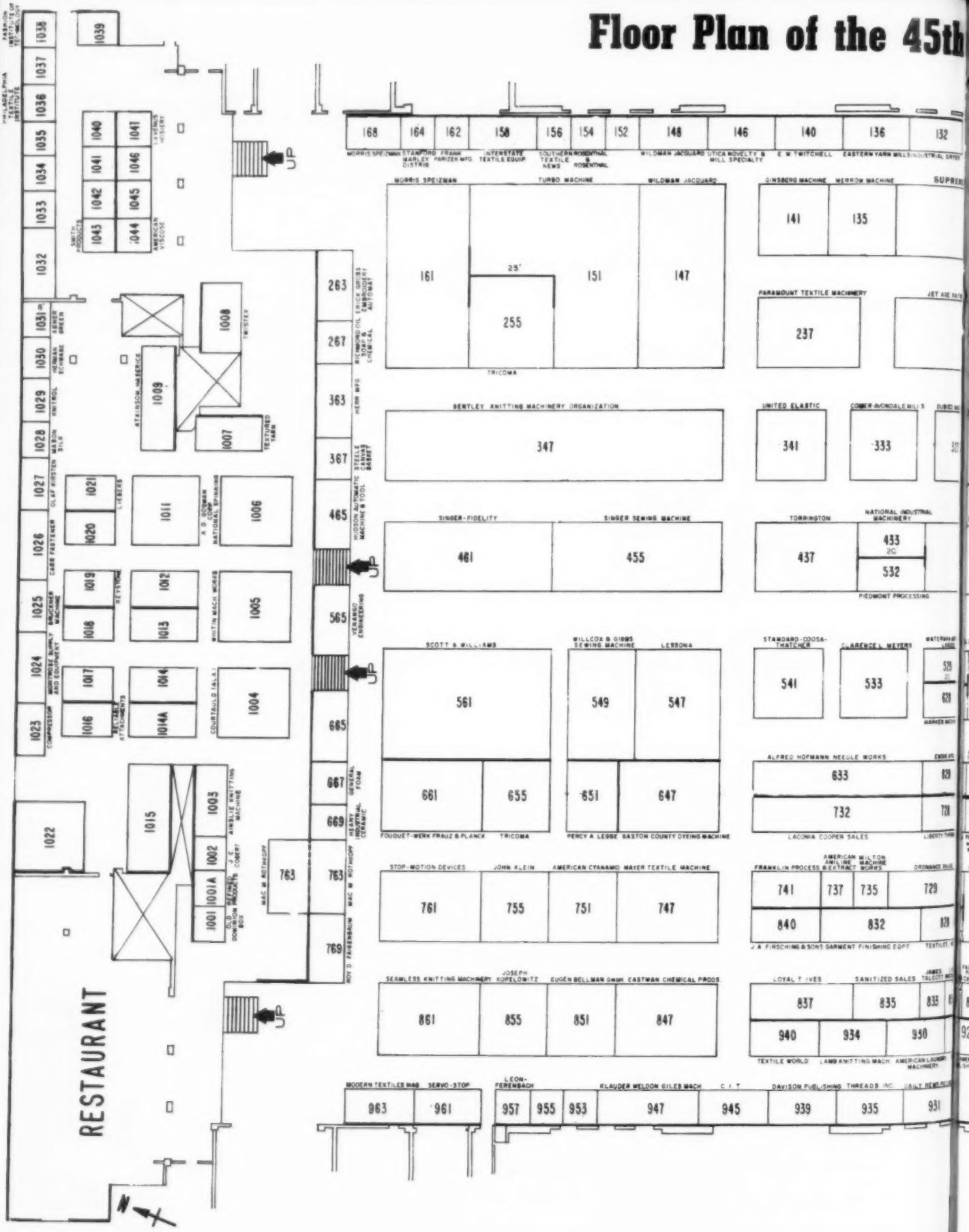
2. Plan to see all the exhibits. If you can't, see all that apply to your product field. Although an exhibit is out of your field, there may be something in it that may be adapted in your plant.

3. Carry a pad at all times to note down points about equipment, yarns or other displays that interest you or that may in the future have some value to your company or that you may want to describe to other members of your organization.

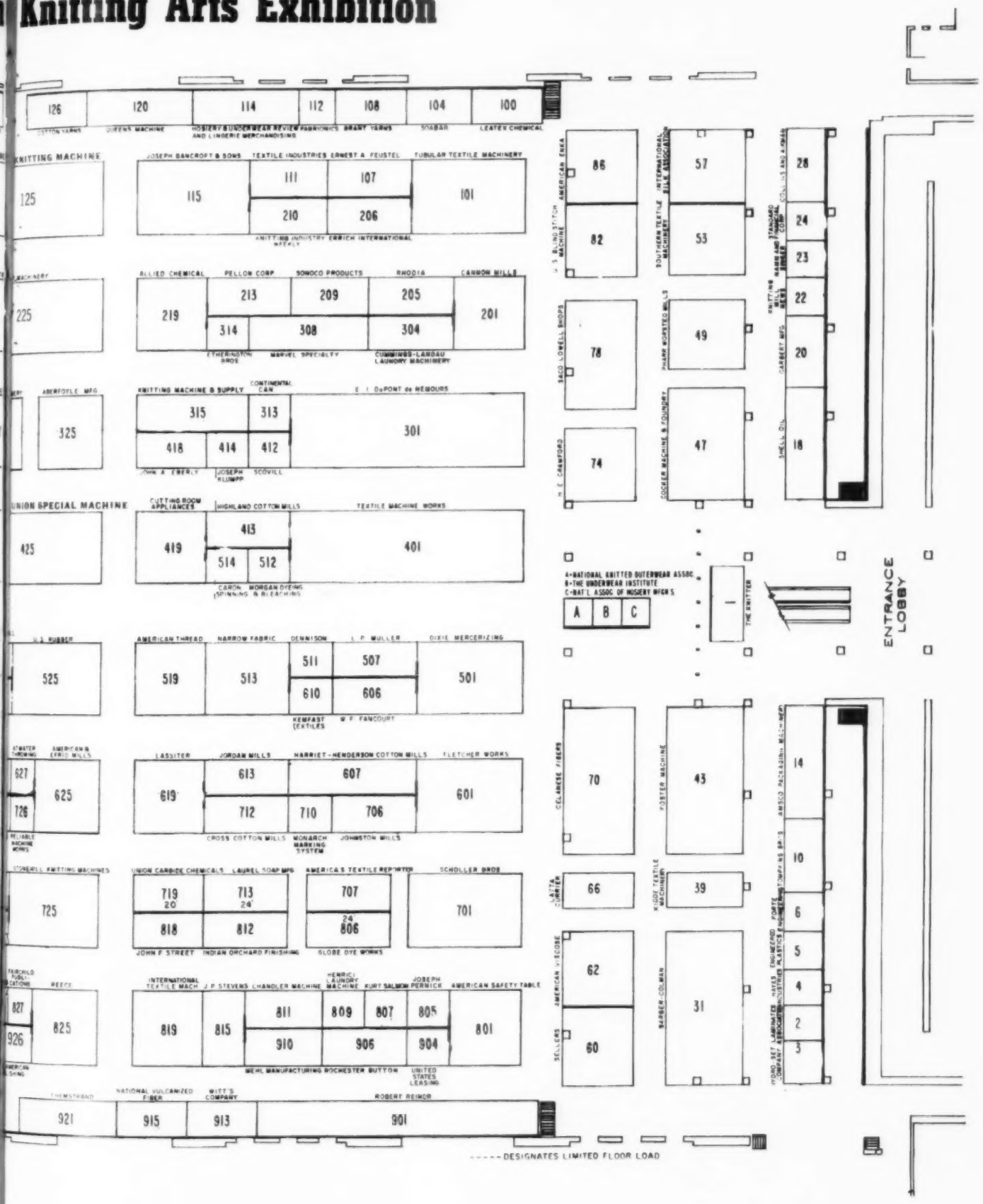
4. Carry a large folder or portfolio for descriptive literature. This serves as memoranda of the exhibiting companies and their products. The wise manufacturer will consult this literature when he gets back to his hotel or when he goes home and then file it for future reference.

5. Take frequent breaks. There are seats at many of the booths and a lounge. By resting often, you will be in better shape to give the displays the study and analysis they require.

Floor Plan of the 45th K



45th Knitting Arts Exhibition



American Enka booth #86 at the knitting arts show, Atlantic City

ENKA NYLON ...focal point for fashion at the knitting arts show

ENKA makes big fashion news in . . . **15-denier seamless stretch hosiery** with a shaped foot that clings to the slimmest ankle.

20-denier monofilament sheer hosiery that looks as soft and sheer as 15-denier hosiery, yet outwears it by at least 35 per cent.

Panti-stocking combinations that fit like second skin.

Support stockings with shapelier fit for greater support plus the sheerness of daytime hosiery.

Dazzling white foundations made of Enka's different Blanc de Blancs(TM), "white of whites" nylon.

Lingerie tricots in Enka nylon with a soft, pleasing hand, sparkling depth of color and marvelous absorbency.

Outerwear tricots in brushed and unbrushed suede effects with more cover because of Enka nylon's great bulking quality.

Raschel fabrics for bouffant skirts and petticoats with a crisper hand and more snag resistance. Raschel fabrics for gloves with better elasticity because of Enka's higher elongation.

Men's Ban-Lon® half-hose and sport shirts with extra softness, perfect fit and truer colors.

And Enka's making big promotion news with . . . a powerful advertising and merchandising program that creates a *fashion image* for nylon users. Handsome consumer ads, sales brochures, direct mail, hangtags, showroom and counter displays keep the fashion products of Enka nylon constantly before the retailer and consumer.

See you at BOOTH #86 at the show—or call Enka Merchandising in New York at 350 Fifth Avenue, PE 6-2300 for the profit-winning facts.

American ENKA Corporation, Enka, N. C. • Producer of nylon • rayon • yarns • fibers

NEW YORK OFFICE: 350 Fifth Ave., New York 1, N. Y. • DISTRICT SALES OFFICES: Greensboro • Providence

American Laundry Machinery Industries (Booth 930) Finishing equipment. The company's new Hydrex automatic washer-extractor will be shown for the first time. The unit in a 29-minute cycle, washes, rinses and extracts a 50-lb. (dry wt.) load, ready for ironing or drying. The operation is entirely automatic except for the addition of washing supplies on signal. Other equipment which will be on display will include a two-speed 42x54 inch removable horizontal partition cascade washer, a Monex extractor and a Thermatic drying tumbler.

Personnel in attendance: R. L. Gerling and R. S. Shaffer.

American Safety Table Co., Inc. (Booth 801) Sewing room equipment and supplies.

American Thread Company, Inc. (Booth 519) Knitting yarns and sewing thread. Reception booth with displays of various items produced from company's yarns and thread.

Personnel in attendance: E. B. Shaw, president; C. E. Bowne, vice president; H. Horrocks, vice president; R. D. Hall, general sales manager, yarn; W. J. Fluegel, B. Lavery, R. J. Fontaine, F. R. Causy, R. A. Bliss, T. N. Madden, R. K. Howell, Jr., D. E. Howe, J. W. Kennedy, E. Roller, W. Pretty, M. Tuttle, R. Latawiec, W. B. Farrell, N. Blackledge.

American Viscose Corporation (Booth 62) Synthetic fibers. Family of new Avisco fibers will be shown. Among the new fibers to be displayed are Avron high strength rayon, Avril stable rayon and Avlin multi-cellular rayon. The important role of Avisco acetate yarns in the knitting industry will also be stressed in the exhibit as well as the Avisco Integrity Tag Program. In addition, the display will feature industrial applications of rayon, the many uses of cellophane films, Tyrex rayon tire cord and Avistrap cord strapping for industrial packaging purposes.

Personnel in attendance: George L. Storm, vice president; M. V. Macfarlan, general sales manager; Dr. C. J. Geyer, C. S. Brown, C. J. Mills, N. A. Cocke, S. H. Rose, R. F. Thayer, J. R. Durbin, J. P. Mervine, C. H. Scott, D. A. Davis, and J. C. Folsom.

Ainslie brushing machine on view in Booth 1003.

Amsco Packaging Machinery, Inc. (Booth 14) Packaging equipment. A new, compact version of the company's Amscomatic packaging method for packaging knit products in polyethylene and other film materials will be introduced. Called the Amscomatic 75 series, the new unit brings the versatility of the larger Amscomatic 100 series to installations with more modest production requirements. The Amscomatic also fills the need of large firms operating under a decentralized packaging program, requiring several compact packaging units at different locations in the plant.

Equipped with an eight-foot infeed conveyor the new installation handles the output of a single bag loading machine; with a 10-foot conveyor it seals the output of two bag loaders.

The Amscomatic 75 is available in two models. The Model 75-FA is equipped with a wide bottom infeed conveyor belt riding at an angle off horizontal and having a three-inch guide belt. This model is recommended for soft goods such as T-shirts, three-packs, etc. For handling rigid packages such as card-supported hosiery or briefs wrapped around an inner board, the Amscomatic 75-H is recommended.

Amsco is also introducing its Amscomatic 300 Label Applicator on a mobile stand. This equipment is designed to place automatically a pressure sensitive ticket or label on a package traveling along virtually any conveyorized packaging or delivery line. Operating independently or in conjunction with packaging machinery, it may be automatically integrated with an imprinting or marking machine, thus combining imprinting and application of labels in a single completely automatic operation.

Several other Amscomatic packaging method installations will also be shown. These include an Amscomatic 100 for variety textiles; an installation for baling of multiple packed items with automatic application of inventory and stock ticket to the end of each bag; an Amsco PJL bag label sealing machine for sealing poly and other film bags while simultaneously applying a saddle label over the bag top. Also being shown is a Model PJ bag sealing machine for sealing K cellophane bags and automatically punching a hole for rack packaging.

Personnel in attendance: Edwin E. Messmer, president; John D. Sylvester, vice president; John D. Keenan Jr., secretary; Gene G. Cignoli, assistant secretary; Edward P. Primosch, Edward H. Watson, Stephen R. Watson, Herbert K. Weber, Frank P. Czifra, John M. Kelly and George A. Wiedersheim.

Atkinson, Haserick & Company, Inc. (Booth 1009).

Atwater Throwing Company (Booth 627) Textured filament yarns. Textralized, Fluflon, Helanca, Taslan and Agilon process yarns and knitted garments and fabrics produced from these textured yarns will be shown. Included in the display will be outerwear garments and fabrics of Ban-Lon processed Antron and Cadon yarns and WL textured yarns in heather blends. Others items on display will include No. A-4 CS thread for seaming of hosiery closures and Ban-Lon tricot fabrics.

Personnel in attendance: E. J. Schellenberg Jr., president; R. P. Schellenberg, vice president and sales manager; S. D. Counterman, technical director; C. Jones, purchasing agent; W. O'Neill, production manager; Huggins Clelland, Inc., A. Mebane, V. Julian, F. Sharpe, sales agents.

Bancroft & Sons Co., Inc., Joseph (Booth 115) Textured yarns. Display is aimed at demonstrating the scope and depth of the Ban-Lon program and showing the variety of fibers, fabrics and garments produced from Ban-Lon processed yarns. Specific items on display will include fabrics and garments made from various fibers modified via the Ban-Lon crimping system and which are approved to carry the Ban-Lon quality trade mark.

Personnel in attendance: L.W. Rainard, E. H. Shatttuck, E. P. Mersereau, F. A. Cooper, R. A. Pici, J. M. Huling, D. A. Graham, C. E. Vollmer, A. N. Behnice, W. M. Teta, H. L. Johnson, W. A. Geiler, A. L. Trifunovic, J. D. Bradley, A. A. Benedek.

Barber - Colman Company (Booth 31) Winding equipment. Display will consist of a 20-spindle Type FF automatic spooler, winding six degree cones for a knitting machine.

(*Continued on Page* 47)

Hydrex washer-extractor to be shown by American Laundry Machinery Industries.

FIRST *in equipment...*

- Floating driven spreader.
- Totally relaxed drying.
- Continuous spreading and chemical processing.
- Tandem wet processing and drying ranges.
- Straight stripe calender.
- Stripe matching machine.
- Shrinkage control finisher.
- Tensionless calender.
- Electronic sweater framer and steamer.

ORIGINAL *in purpose...*

Tube-Tex machines have made possible new processes to broaden the use of knitted fabrics, such as:—

- Chemical finishing, resin treating and curing.
- Relaxation control.
- Perfectly matched stripes and patterns.
- Single-pass calendering and finishing.
- High-speed continuous drying.

for over 30 years knitting industry leaders...

EXPERIENCE *in the mill...*

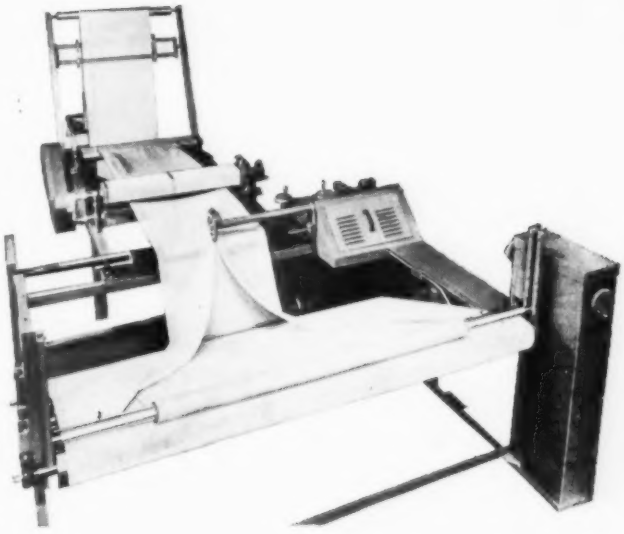
for more than a quarter of a century... Leadership in design engineering and technical skills. **Tube-Tex** experience has been devoted *exclusively* to the advanced finishing of knit fabrics. No other company in the world can make this claim.

SERVICE *that counts...*

Trained technicians and skilled engineers are always "at ready" to solve mill problems, help develop new finishing techniques, improve daily productive operations and increase customer profits.

And coming soon! Two more major advances in the art of knit goods processing.

look to



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A machine designed to meet the rapidly expanding needs of the circular knit industry. Relaxed spreading and steaming combined with controlled slitting, opening and packaging.

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KNITTING ARTS EXHIBITION · CONVENTION HALL · ATLANTIC CITY, NEW JERSEY

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Everyone **wants a fast-moving line of shirts, socks, dresses or outerwear! Everyone can *have* it with knits of Corval or Coloray fiber! Manufacturer and converter sales records prove it! Corval and Coloray add new depth to color, new variety to patterns. Both result in texture triumphs with natural warmth and comfort. Both provide freedom from pilling, fuzzing and clinging in blends with synthetics. What's more, solution-dyed Coloray rayon fiber offers fleecy-soft hand and complete colorfastness: no fading, no streaking... no matter what! Cross-linked Corval rayon fiber contributes an all-enhancing, all-around aura of richness and color-ability. All great powers of attraction! Feature Corval and Coloray in *your* knit line—solo or in blends. They have the qualities that make sense because they make *sales!* For technical assistance, write:**

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CORVAL® & COLORAY®... FIBERS FROM COURTAULDS' NEW WORLD OF RAYONS

Bellman, GMBH Maschinenfabrik, Eugen (Booth 851) Finishing equipment. Company will exhibit for the first time in the U. S. a machine which automatically scours, dyes, sets, finishes and dries ladies' hosiery of all deniers and of any construction including crepe and stretch hosiery. Personnel in attendance will be Curt Kronsbein.

Bentley Knitting Machinery Organization, Inc. (Booth 347) Knitting equipment. A larger number of Bentley knitting machines than has ever been shown before in this country will mark this company's exhibit. Outerwear equipment to be demonstrated will include four multi-feed models for knitting double pique, other double jersey and links and links fabrics. Also on display will be the company's fully automatic Model UO/AE full-fashioned outerwear knitting machine.

The exhibit will also include a new skein dyeing machine built by Samuel Pegg & Son, Ltd., a member firm of the Bentley Group. It is designed for hank-dyeing of practically every type of textile fiber with nearly every type of dyestuffs. The machine is claimed to be revolutionary in design.

Alfred L. Hutton Jr., president, and members of the Bentley Group from England and Canada, and the Providence, R. I., and Charlotte, N. C., offices will be in attendance. A special consultation room on the mezzanine (Room 18) will be available.

Brant Yarns, Inc. (Booth 108) Knitting yarns. Personnel in attendance: Irving Brant, William Barest and Robert A. Field.

Bruckner Machinery Corp. (Booth 1025).

C. I. T. Corporation (Booth 945) Factors. Flexible and varied financing plans to meet the changing financial problems of the modern knitting industry will be explained.

Personnel in attendance: E. T. Neville and D. V. McCarthy, vice presidents; D. N. Arnold, J. C. Reece, Clem W. Howe, Walter Schilling and George Allis.

Cannon Mills, Inc. (Booth 201) Knitting yarns. Exhibit will consist of carded and combed, natural and dyed yarns as well as carded and combed

Cummings-Landau will display this reversing drying tumbler.

heathers made from cotton and synthetic fibers.

Personnel in attendance: W. C. Cannon, D. A. Long, R. L. Holbrook, Thomas R. Smith, Dolan Frye, John Morrow, Roy Dellinger, James C. Williams, J. W. Turner, J. C. Bartlett, F. A. Dusch Jr., J. F. Russell, C. V. Albright, Henry Crumbliss.

Carbert Mfg. Co., Inc. (Booth 20) Packaging equipment. Company will introduce for the first time a bag loading machine which operates in conjunction with its Model 1010 bag sealing unit. A second unit which will be demonstrated is an imprinting labeler with a conveyor.

Personnel in attendance: R. W. Saumsiegle, R. L. Hewson and R. Wing.

Caron Spinning Company (Booth 514) Knitting yarns. Display will consist of natural and synthetic blend yarns. In natural fiber yarns, conventional worsted and mohair and alpaca yarns will be highlighted. In synthetics, the display will include Orlon Sayelle, Acrilan, Creslan, Zefran and Darvan yarns.

Personnel in attendance: O. J. Caron, John Caron, W. H. Stocking, Richard Caron, Richard Judge, A. J. Amatruda and B. J. Zintak Jr.

Carr Fastener Company (Booth 1026) Garment closures.

Celanese Corporation of America (Booth 70) Synthetic fibers and yarns. Fabrics and garments made from Celanese fibers and yarns will be shown in applications ranging from tricot to double knits. Among the fabrics which will be displayed are Arnel 60 double knit, tricot employing the use of Arnel and acetate filament yarns in combination with other fibers in brushed and sueded fabrics, knitted three-bar tricot where Arnel is used as a basic yarn for crepe type fabrics, Arnel and cotton circular knits, Arnel and Corval, Arnel and acetate in blends or combinations with other fibers, Celaperm.

Personnel in attendance: Hamilton Macauley, George Hein, William O'Neil, Robert Grovet, John Gross.

Chandler Machine Company (Booth 811) Sewing equipment.

Chemspun Yarns, Ltd. (Booth 136) Knitting yarns. Joint display with Eastern Yarn Mills and Templon Spinning Mills.

Chemstrand Corporation (Booth 921) Synthetic fibers. The display will consist of use of Acrilan in double knit jersey, in brushed sculptured and multicolor units, combinations of Acrilan and Acrilan 16 in sweaters produced via single bath dyeing; textured Chemstrand nylon yarns, Cadon nylon multi-lobal yarns, knitted fabrics laminated with Acrilan and Chemstrand nylon, and potentialities of Acrilan-Spectran, the company's solution-dyed acrylic fiber.

Personnel in attendance: Edward A. O'Neal Jr., president; William G. Luttge, vice president, marketing; Bernard F. Bertland, Joseph Tucker, Harry Cramer, Crawford C. Madeira, Edward T. Powers, Paul W. Runge, Robert E. Smith, Masten R. Dalton, Barry Emmert, Robert M. Seibert, Michael J. Koroskys, C. W. Gayler, J. Fred Murray, Ivan Bollinger, Charles G. Flynn, A. R. Schlesinger, Noel Fawcett, Jerome Edelman.

Cobert Associates, Joseph C. (Booth 1002) Testing equipment. Two Volument Hosiery Testing Machines, one a seamless model, the other a versatile combination Volument for testing either seamless or full fashioned stockings, will be on display and demonstrated.

Personnel in attendance: Joseph C. Cobert, president; Joseph W. Cobert, Wm. P. Mulry, Eduardo Bertot.

Cocker Machine & Foundry Company (Booth 47) Textile machinery. Exhibit will consist of a new model SB 42 Tricot Warper as well as new design of accumulator rolls and sample creels. Personnel in attendance: John C. Bodansky, O. L. Davis, F. H. Cunningham Jr., T. F. Suggs, John McCoig.

Collins and Aikman Corp. (Booth 28) Knitting yarns.

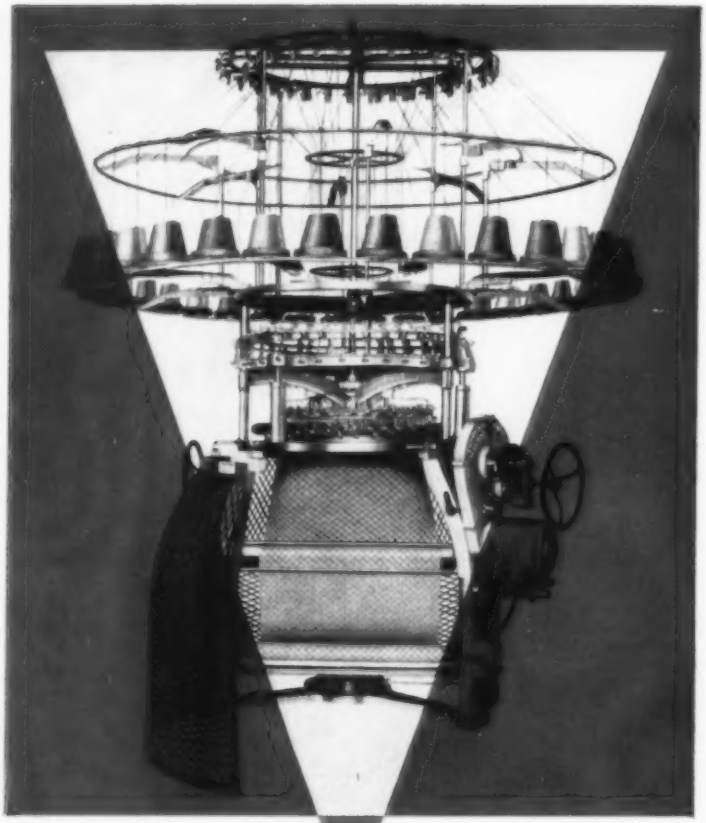
Comer-Avondale Mills, Inc. (Booth 333) Knitting yarns.

Compressor Corporation of America (Booth 1023) Clean-

(*Continued on Page* 51)

Knit shirt producers will be interested in this Schwabe garment die cutter.

SUPREME



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Double-Pique Fabric Up To 20 Yards Per Hour

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Other Fabric Up To 40 Yards Per Hour

Write for free booklet on this important advance in the interlock field

UNEQUALLED VERSATILITY

30" dia., 36 feeds in cuts through 16 needles per inch—produces "Double Pique" and "Grenadine" fabrics; "Blister" stitches, plus a tremendous range of other patterned rib or interlock.

50% GREATER PATTERN AREA THAN ANY OTHER MACHINE

Plus a spectacular range of patterns and textures. Wheels available for special pattern fields, (L shaped, argyles, etc.).

SOME OTHER MODELS IN THE SUPREME LINE OF PROFIT-KNITTING MACHINERY—

MODEL SAI-PP—Striped and Patterned 1 x 1 Rib—Also Swiss Rib and Interlock

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MODEL MLVP/N—Pile, Loop, Plush, Plaited Patterned and Velveteen

MODEL BRW—1 x 1 and Half Cardigan Plain and Patterned Bulky Fabrics

MODEL ROF/N—Jacquard-Type Floatless Patterns

MODEL IRW-2

Unsurpassed Versatility In

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SIMPLIFIED CONTROLS

Easily adjusted to control both fabric elasticity and surface "birds-eye" effect. Can be readily set to produce pique fabrics in Swiss, French or other constructions.

DUAL RACEWAY

Needles of either raceway may be independently set in knit to tuck or knit to welt positioning.

AVAILABLE WITH

(1) "ROLL-O-MATIC" FEEDING DEVICES —Permit use of wide variety of yarns—Maintain uniform tension at knitting points, (2) VARIABLE SPEED MOTOR—For R.P.M. changes at the turn of a lever.

Plus All SUPREME Standard, Mill-Proven Construction Features

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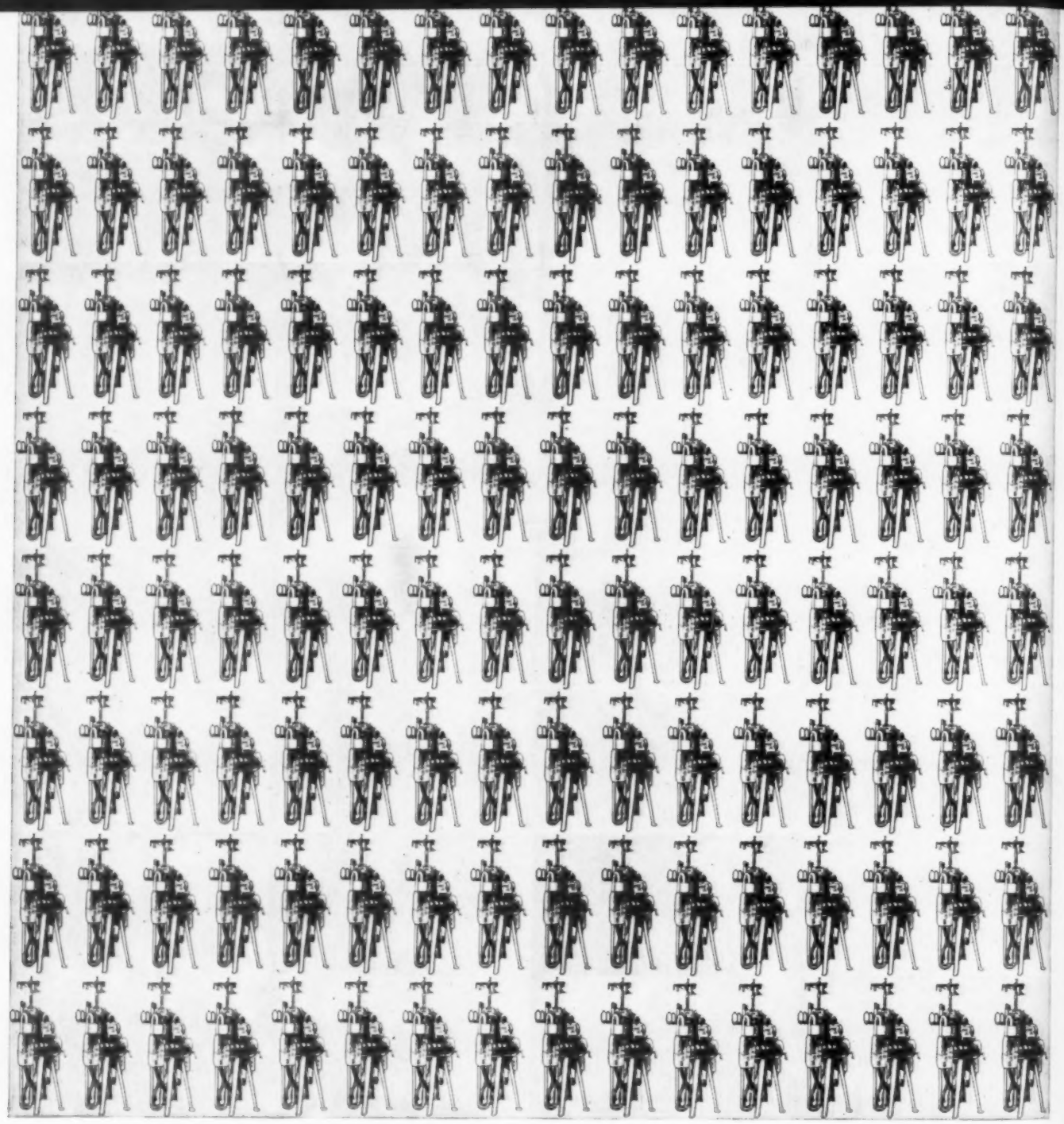

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Read what mill owners say about outstanding trouble-free performance of the Reading-Booton Seamless Hosiery Machines:

"Lightens our fixer load . . . one experienced fixer and one fixer-helper for 128 Reading-Booton Machines . . . ease of maintenance unsurpassed by any machine of its type . . . parts are completely accessible . . . the best designed machine we have seen . . . more dozens from every needle."

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TEXTILE MACHINE WORKS

Where engineering makes the difference

ing equipment. The company will display the Mistral B cleaning gun. Personnel in attendance: Lawson Scott, E. Hays Reynolds and C. Milton Tanner.

Continental Can Company (Booth 313) Packaging material. Flexible packages for use in knitted outerwear and other knitted articles will be featured. Personnel in attendance: W. C. Curtis, Stanley Gaines, Carl Brady and N. S. Hewitt.

Cotton Yarns, Inc. (Booth 126) Knitting yarns.

Courtaulds (Ala.), Inc. (Booth 1004) Synthetic fibers and yarns.

Crawford Co., Inc., H. E. (Booth 74) Knitting machinery. Company will show for the first time CMP/1 (Crawford Multi-Pattern) hosiery machine which produces hosiery for men, boys and misses all on one machine. Manufactured with a four-inch cylinder, the machine has three 25 step pattern drums to give unlimited pattern range and styles.

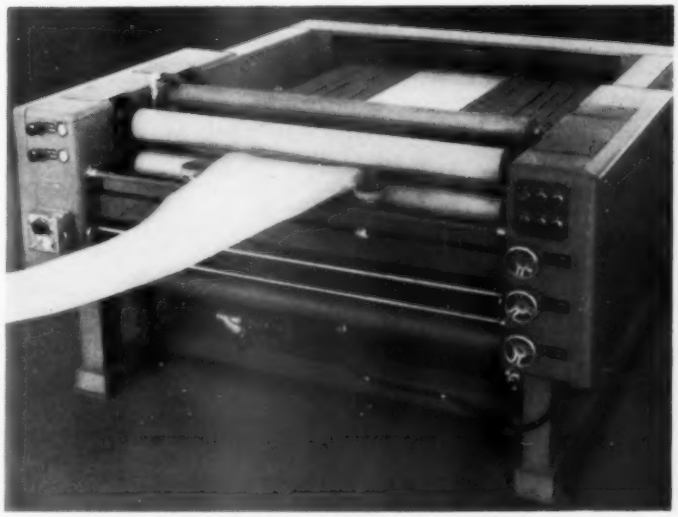
Also on view for the first time will be the Somerset thread clipping, turning, inspecting machine which trims, inspects, turns and classifies hosiery. Firsts, seconds, thirds are classified and deposited into separate containers with only one operator. Production of 500 dozen per eight-hour shift is estimated with this new machine.

Personnel in attendance: H.E. Crawford Jr., Thomas A. Fulton, Roy D. Johnson, Milford Smith.

Cross Cotton Mills Co. (Booth 712) Knitting yarns.

Cummings - Landau Laundry Machinery Co., Inc. (Booth 304) Finishing equipment. Equipment to be demonstrated includes 36 x 54 inch C/L stainless steel washer; 30 inch C/L stainless steel extractor; 37 x 30 inch C/L steam heated reversing drying tumbler; C/L washer-extractor.

The 37 x 30 inch C/L steam heated reversing drying tumbler will be exhibited for the first time. This machine has a solenoid operated air inlet damper which automatically admits cool air at the end of the time cycle; a magnetic door latch for safe door closing, eliminating triggers, buttons and springs; built-in self-cleaning lint screen which is easily removed from the front of the machine; and automatic back draft damper to prevent blow back of hot air and lint.



New Turbo Spreader-Steamer which will be demonstrated at KAE.

Personnel in attendance: E. Cummings and David Green.

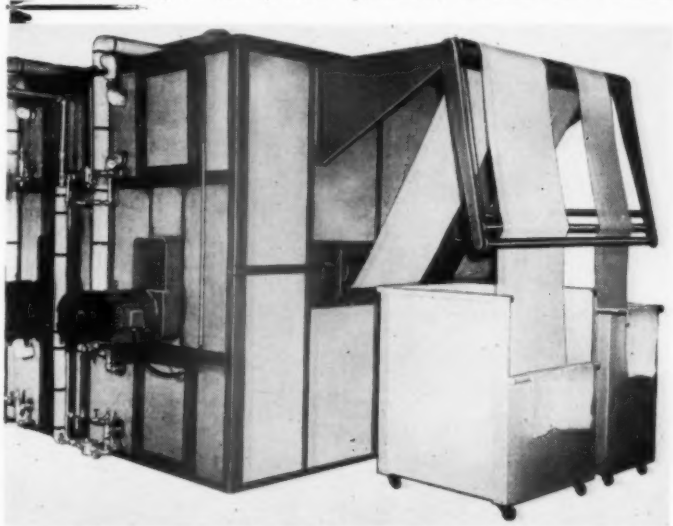
Cutting Room Appliances Corp. (Booth 419) Cutting room equipment. The exhibit will consist of CRA Electromatic cloth spreader, a motor driven machine for woven materials; CRA Electric knit goods spreader for tubular knit fabrics; new CRA Champion Model W, a tension free spreading machine with automatic slitter for open tricot fabrics up to 120 inches wide; and CRA metal sectional cutting tables; CRA Clipmatic thread trimmers.

Personnel in attendance: Bert Gottschalk, H. Bard, Bernard Korn, Al Greene, John E. Fox, Sydney L. Hirsch, Aaron Maimin, Abe I. Pransky.

Dennison Manufacturing Company (Booth 511) Packaging equipment. Display will feature Model B Dial-Set machine for imprinting textile fiber content information. This machine makes it possible for manufacturer to combine textile fiber content information on the same tag that carries style and size information.

Also to be displayed is a booklet pinning machine which eliminates cost of manually attaching tagging to knitted goods.

Dixie Mercerizing Co. (Booth 501) Knitting yarns. Exhibit will include cotton yarns and products; dyed Turbo yarns and products; Creslan and Creslan blend yarns and products; staple spun Orlon yarns; spring 1962 colors.



Model of this Saco-Lowell Fleissner dryer will be demonstrated for tensionless drying of tubular knit fabric.

Personnel in attendance: J. Burton Frierson, president; C. Ralph Ewing, vice president; Arthur K. Johnson, vice president; Peter D. Morrow, sales manager; Mabel Nolan, advertising manager and stylist; Walter Logan, Fred Frank, E. R. Kimball, W. C. Henderson, Preston Dalglish, J. Blackwood Cameron, William A. Eipper, Richard Sussman, Irving Sussman, George Porges, Robert Voigt, George Veness, George Bryan, Wilbur D. Evans, Mark Munsill, Alexander Cameron, Lee Hill, William H. Michael.

Dubied Machinery Company (Booth 327) Knitting machinery. Three machines will be exhibited — the company's Type DLA V-bed flat machine, the Wevenit A - 24 and Type NHF-2. The first machine is the newest member of the company's D group of V-bed flat knitters. It is a double lock high and low butt needle machine with a widening attachment which introduces needles one at a time at both selvedges. The machine is capable of producing either two widened pieces at a time or a single widened strip. It is a 62-inch machine and is available in 12 needles per inch.

The Wevenit Model A-24 is the company's well-known circular yardgoods machine designed for the production of double jersey fabrics for dresses and suits. The machine turns out these fabrics either plain or with large non-spiral jacquard designs. The machine utilizes a special type of pattern wheel, one at each of its 24 feeds, which may be made automatically sensitive or non-sensitive to a pattern magazine which is in the form of an endless metal tape running continuously around the machine.

Type NHF-2 is a hand knitting unit equipped with high and low butt needles and combined tubular and cardigan cams. Two yarn carriers are provided on the single front and rear bars.

The machine on display will be in the coarse gauge of 2½ needles per inch, the needlebeds 40 inches wide. Hand machines are particularly useful in these heavy gauges, as the possibility to make full-fashioned garments avoids the very bulky

(*Continued on Page* 53)

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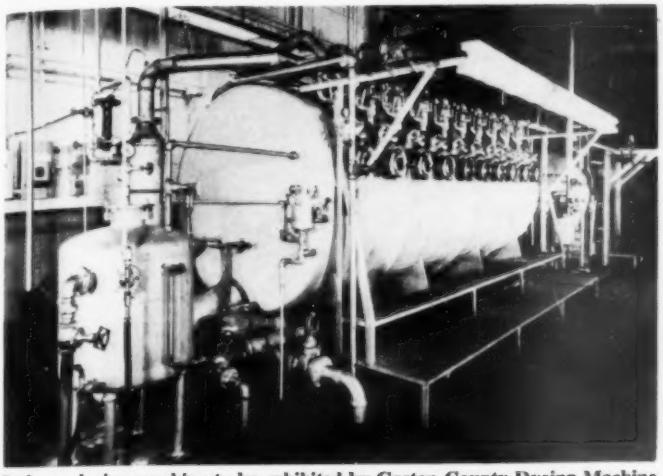


Jet beam dyeing machine to be exhibited by Gaston County Dyeing Machine Co.

seams that would result in cut and sewn articles. The labor cost is in many cases completely absorbed by the yarn saved, especially when knitting wool.

The Type M-21 power attachment which will be displayed with the NHF-2 machine has an adjustable stroke which may be varied easily without stopping the machine. The attachment removes from the operator the onus of having to operate the carriage manually and allows him to concentrate on the fashioning of the garment.

Du Pont de Nemours & Co., E. I. (Booth 301) Synthetic fibers. The company's display will be divided into four areas — hosiery, sweaters, flat knits and circular knits.

In the sweater area, end-uses for display will include men's furnishings, women's outerwear, children's wear and boys' wear. The only Du Pont fiber will be Orlon acrylic fiber in several different types, including Orlon Sayelle bi-component acrylic fiber. Approximately 30 garments will be shown, as well as yarn samples demonstrating differences between the various types of Orlon.

The flat knit area will include intimate apparel, boys' wear, children's wear, furnishing and sportswear and women's outerwear. Du Pont fibers will include nyon, Dacron, acetate and Lycra. In nylon, items to be illustrated will include satinette fabrics, both regular and lightweight; tricot of Antron nylon, up to 15 fabric antistat finishes; single-end packages; beams—tricot and Raschel; and lace. For Dacron there will be shirts, intimate apparel calendered fabrics and tricot beams. Foundation fabrics will highlight the use of Lycra.

In the circular knit area, women's outerwear, children's wear, men's furnishings and sportswear and boys' wear will be exhibited with nylon, Antron nylon and Orlon acrylic fiber being the predominant fibers. Among the items to be displayed will be blends of Orlon and cotton in children's sleepwear, nylon in stretch knit fabrics, stretch swim suits of Orlon and nylon, sheared fleece coats of Orlon, women's rainwear in laminates of wool and Orlon, and double knit jersey garments in women's suits and coats.

All areas will be manned by Du Pont marketing and technical service representatives.

Eastman Chemical Products, Inc. (Booth 847) Synthetic fibers.

Eastern Yarn Mills, Inc. (Booth 136) Knitting yarns. Joint display with Templon Spinning Mills and Chemspun Yarns, Ltd.

Ehemann, Kurt (Booth 665) Pressing and calendering equipment.

Engineered Plastics, Inc. (Booth 5).

Eberly, Inc., John A. (Booth 418) Knitting room supplies.

Emsig Mfg. Co. (Booth 629) Buttons and shank button feeders.

Errich International Corp. (Booth 206) Packaging equipment. New machinery on display will include two different bag sealers — Model 7-09 and Model 11-17. Both are compact sealing units designed for sealing polyethylene bags. The exhibit of new equipment will also include the Harvey bar sealer, an inexpensive thermostatically controlled heat bar recommended for sealing polyethylene packages.

In addition, the company will feature three models of its speedy bag packager, each designed for sweaters, hosiery and bulky items such as blankets or chenille goods. The sweater bag sealing unit is recommended for polyethylene bags 6 to 11 inches wide. It will automatically open lip bags.

Etherington Brothers, Inc. (Booth 314) Knitting yarns. Reception booth. Personnel in attendance: F. H. Etherington, president; B. H. Etherington, vice president and treasurer; J. P. Daly Jr., R. Crawford, R. T. Davis.

Ewing - Thomas Corporation (Booth 201) Knitting yarns. On display, in cooperation with Cannon Mills, Inc., will be natural, bleached and dyed mercerized yarns. Personnel in attendance: James L. Rankin, Jesse W. Jester, George W. Fiss, Richard E. Rankin, David Thomas, Jacob F. Meschter and George E. White.

Fabrionics Corporation (Booth 112) Quality control devices. The display will include the company's Detect - All, warp yarn monitor, and Watchman, Una-Mag tension device. In addition, the Rothschild Tensotron, Static Voltmeter, F-Meter will be shown.

The warp yarn monitor is designed for use in both tricot knitting and in beaming of yarns for tricot work. The monitor which is inserted to the rear of the warper automatically detects filament yarn defects above a selected size and stops the warper before the defect is put up on the beam.

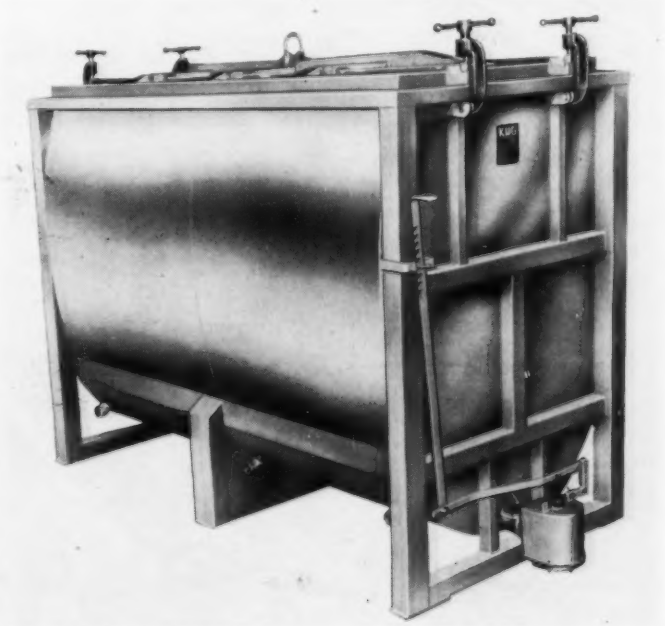
Personnel in attendance: Vincent E. Lynch, Olen Marks and Gerald Hull.

Faigenbaum, Roy D. (Booth 769) Knitting attachments and accessories. The company will display its Twistension device which produces snag-free unwinding of yarn regardless of cone, tube or pirn size. Also on display will be the Solis automatic tension device with stocking inverting mechanism. Other products to be displayed include a complete assortment of Regalox industrial ceramics, Mitchell sinkers, cylinder jacks, and Toone twin feed and chevron mesh attachments, and Charnwood double hooked latch needles.

Personnel in attendance: Roy D. Faigenbaum and A. Benson Davis.

Fancourt Co., W. F. (Booth 606) Textile chemicals. Knitwear finished with Fancourt tex-

(*Continued on Page* 55)



Klauder Weldon Giles will demonstrate this DUO-FLO suspended skein type dyeing machine for high-bulk Orlon and other fibers.

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tile auxiliaries will be on display. Personnel in attendance: John L. Fancourt, Frederick T. Broadhurst, Thomas Lindley, Donald Loeber, John McFarlane, Robert Rhodes, Willard Sawyer and Claude Wolff.

Feustel, Inc., Ernest A. (Booth 107) Knitting attachments and accessories. Display will cover carriers and tubes in all gauges for all types of full-fashioned machines, Saxonia flat parts for seamless and full-fashioned machines, and Redditch hosiery latch needles in fine gauges and coarse gauges for seamless hosiery, half-hose and sweater machines.

Personnel in attendance: Frank C. Feustel, J. K. Blackwell, David King, Hubert Hurley, Lewis T. Ballard, Carl McAnally.

Firsching & Son, Inc., J. A. (Booth 840) Cutting room equipment. Display will consist of cloth laying-up machines designed for tubular knitted fabrics and cutting and winding machinery for bias and straight bindings. The cloth laying-up machines include automatic and hand models. The latter weigh less than 95 pounds.

Both types of units are equipped with fluorescent lighting which enables the operator to spot cloth imperfections quickly. The display of cutting equipment includes a knit goods cloth slitting machine capable of handling all sizes of tubular knitted fabrics in rolls of 14 to 30 inches. In attendance will be Robert A. Firsching.

Fletcher Works, Inc. (Booth 601) Miscellaneous equipment. The three new machines—the Filling Wind Re-Draw; Power Fab Elastic Web Loom and the Novelty Yarn Twister—will be demonstrated. Personnel in attendance will include Edward T. Taws Sr., president, and a group of company officials.

Forte Engineering Company (Booth 6).

Foster Machine Co. (Booth 43) Winding and quality control devices. Exhibit will be built around the company's Model 506 cone winder, the Lindly yarn inspector and Lindly Electrotense.

Personnel in attendance: E.C. Connor, president; J. W. M. Lozier, treasurer; P. H. Farmer, sales manager; E. P. Dodge, E. H. Ely, G. W. Mallory, John B. Davenport, C. A. Faunce, R. B. Kendall and F. F. Stange.

Fouquet - Werke, Frauz & Planck (Booth 661) Knitting machinery. Exhibit will include a range of double jersey knitting machines capable of producing non-spiral jacquard designs with large pattern field and plain jacquard patterns developed via conventional pattern wheels.

Other equipment on display will include a plain multi-purpose double jersey knitter with 24 feeds; plain single-purpose double pique interlock knitter with 44 feeds; garment - length machines with draw thread separation; machine for testing spinning variations of yarn used for double jersey.

Personnel in attendance will include Messrs. Planck, Bossert, Hausler and Fleischhacker.

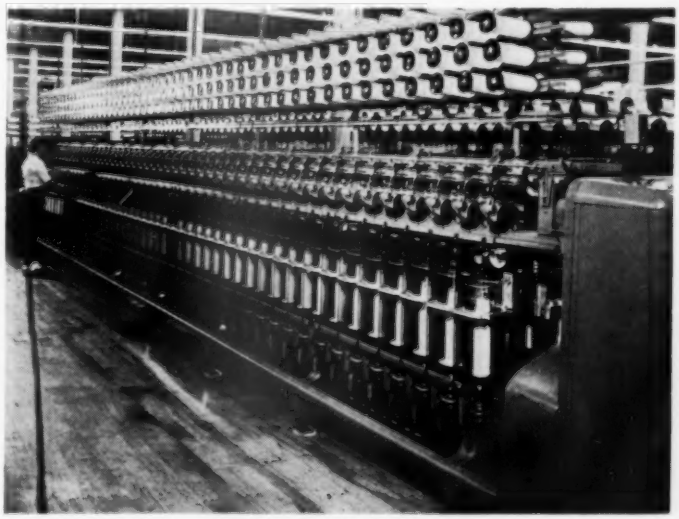
Franklin Process Company (Booth 741) Dyers. Display will consist of package-dyed Colorbred yarns of cotton, spun rayon, spun nylon, Acrilan, Orlon, Textralized nylon, wool, worsted, Creslan and blends.

Personnel in attendance: Earl Rushon, R. B. Lusignea, R. F. Strahley, W. A. Traver Jr., C. W. Dawson, John G. Edwards, R. S. Allen, S. W. Cable, Byron Drummond, Douglas Grant, H. B. Hall, Leonard Grindrod, J. R. Garner, E. T. Wrenn, Edward Ingle, R. C. McCarthy, Edward Connell.

Garment Finishing Equipment Corp. (Booth 832) Pressing equipment.

Gaston County Dyeing Machine Company (Booth 647) Dyeing equipment. The company will exhibit for the first time a new Jet dyeing machine, the result of three years' combined research by Burlington Industries and Gaston County. Burlington has licensed the latter to build and sell the machine to the textile industry.

Advantages claimed for the jet dyeing principle include the following: (1) Machine may be operated above or below boiling point as required; (2) low dye liquor ratio—10:1 versus 20:1 for conventional dye becks; (3) uniform temperature maintained in all parts of dye bath at all times by controlled heating and cooling; (4) dye bath volume remtains constant due to indirect heating and cooling by exchanger; (5) no reels or drives to chafe and tangle strands of fabric; (6) fabric moved entirely by jet action and dye liquor flow; (7) friction eliminated since fabric is always encased in liquid; (8) level dyeing with no shading from side to side or end to end; (9) complete dye bath exhaustion; (10 improved color fastness and brighter shades; (11) dark shades more easily obtained; (12) soaping and washing much faster and more thorough; (13) less chemical carriers required in processing certain man-made fibers; (14) fabric shrinkage uniform from end to end; (15) finished fabric has better hand due to rapid and constant agitation during processing.



A new large package Ring Twister to be displayed by Leesona Corporation for the first time at the 45th Knitting Arts Exhibition.

General Foam Corporation (Booth 667) Urethane foam. Exhibit will consist of types of foam and foams laminated to knitted fabrics. Personnel in attendance: Werner Norman, Stanley Herschman and Herbert Zeller.

Ginsberg Machine Co., Inc. (Booth 141) Cutting and sewing room equipment. In addition to the entire Trim-Master line, the exhibit will consist of Trimco Sciss-O-Matic, Trimco Angle-Strap Cutter, Double-Tape Sewer. New items on display will include steam shirt folder, Cut-A-Part device, stacking device for Cut-A-Part, and automatic chain cutters.

Personnel in attendance: Howard Ginsberg, Si Margolis, Harold Stout, Larry Gruber, Charlie Gerstein.

Globe Dye Works Company (Booth 806) Dyers. Display will consist of package dyed yarns of Orlon Sayelle, Arnel, cotton, worsted and blends of synthetic yarns. Personnel in attendance: Thomas S. Greenwood, William B. Taylor, Richard W. Foltz and Albert E. Stutzke.

Gosman Corporation, A. D. (Booth 1011) Urethane foam laminators.

Green Associates, Abner B. (Booth 1031).

Gross Embroidery Automat, Inc., Erick (Booth 263) Embroidery equipment. The company will demonstrate its latest 10-head Gross Automat, Model 1010, for designs up to 5 x 5 inches; also a multiplex display stand containing hundreds of embroidered samples of all kinds.

Personnel in attendance: Charles Gross, Raymond Gross and Stanley Semco.

Hayes Industries, Inc. (Booth 4).

Harriet and Henderson Cotton Mills (Booth 607) Knitting yarns. Reception booth. Personnel in attendance: M. Y. Cooper, T. H. Crudup Jr., A. B. Hammond, D. F. Swain, A. G. Sewell, P. H. Dalglish, Marcus Munsill, Walter C. Brown and D. O. Blevins.

Heany Industrial Ceramic Corporation (Booth 669) Thread guides and tension devices. Personnel in attendance: A. O.

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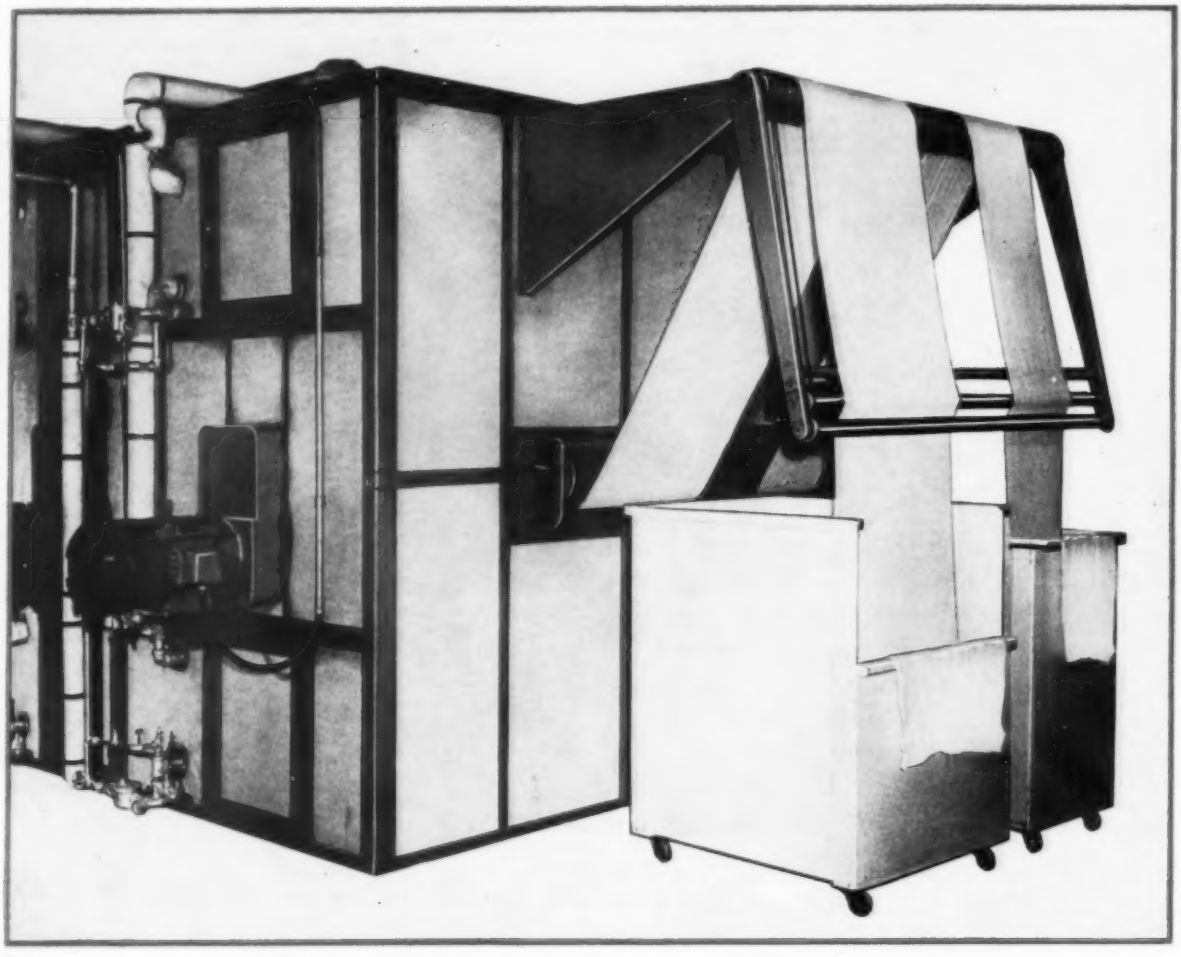

Tension-free drying for knitted goods

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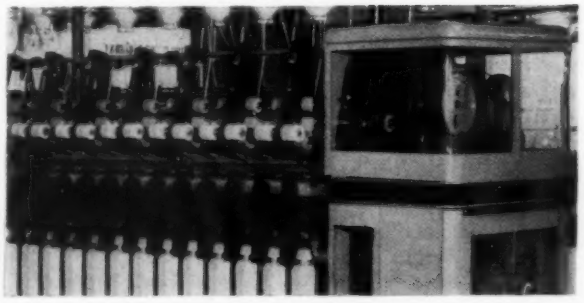
SEE IT AT THE KNITTED ARTS EXPOSITION, BOOTH 78.

Now you can have completely relaxed, tension-free drying that produces higher quality knitted goods. Available for either gas or steam operation, the Saco-Lowell/Fleissner Dryer gives you high production at lower operating costs.

The Saco-Lowell/Fleissner Dryer utilizes reverse action drying and is the only dryer that is self-threading. Its perforated suction drums hold fabric or raw stock in place gently but firmly, while this same air suction dries it. Uniformly . . . and to the exact degree desired to meet your drying or curing needs.

But excellent performance is only part of the story. Controlled tests show the Saco-Lowell/Fleissner Drying System requires only 1.5 pounds of steam to evaporate 1 pound of moisture. Rate of evaporation is also impressive: 3 times more water per square foot of drying surface than any other system!

Your first inspection of the Saco-Lowell/Fleissner Drying System will convince you that, like all Saco-Lowell textile machines, **it's built for better performance, backed by better service.**



Saco-Lowell's Long Staple Spinning System is designed for worsteds, synthetics and blends with 1.5 to 9" staple. It permits 50% higher drafts . . . cuts lubricating and cleaning time as much as 60%.

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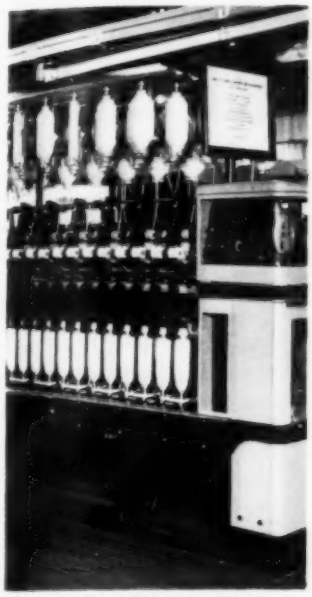

This Saco-Lowell Model SJ-4C worsted spinning frame will be shown running worsted and Creslan.

Pieper, president; R. L. Carroll, Herman Boveri and R. P. Bennett.

Henrici Laundry Machinery Co. (Booth 809) Finishing equipment. Display will consist of full size production model washing machine and drying tumbler for washing and fulling knitted fabrics. Henry W. Maxant, sales manager, will be in attendance.

Herr Manufacturing Co., Inc. (Booth 363) Specialty textile equipment. Display will consist of a complete line of the latest Type M Herr conical rings and holders featuring seam lubrication both for manual and automatic lubrication. In addition, flyers to accommodate all types of yarns for uptwisting will be exhibited.

Personnel in attendance: Hyatt B. Atwood, president; Robert M. Leach, William W. Woodard, James McLean and William K. Anderson Jr.

Highland Cotton Mills (Booth 413) Knitting yarns. Personnel in attendance: N. M. Ayers, H. F. Hunsucker Jr., Gordon Eaves, Leon Safrit, William H. Cronin, Bill Kane, Joe M. McGinnes and Henry Stokes.

Hofmann Needle Works, Inc., Alfred (Booth 633) Knitting needles. Exhibit will consist of latch and spring needles made by Groz-Beckert and Laconia Needle Manufacturing Co., Inc.

Personnel in attendance: Hanns L. Wirth, Bruce Lauderbach, Charles Paulus, Richard Eppler Jr., Hans J. Wirth, George Graves, Kenneth Lingley, Armando Pabon, Howard Bacon, George Veness and Richard Kozel.

Hudson Automatic Machine & Tool Co. (Booth 465) Testing equipment. Shown for the first time will be Model 4011 economy Projectina, a combination projector, comparator and microscope to be used in quality control of fabric showings and fibers. Also to be shown is Model 4014-B projector and microscope with binocular eyepiece for greater visual comfort. In addition, the display will include Polaroid photo attachment for photomicrography.

Personnel in attendance: C.A. Hepp, president, and H. Peter, vice president.

Hydro-Set Company (Booth 3).

Indian Orchard Finishing Co. (Booth 812) Knitted fabric dyers and finishers.

Industrial Dryer Corporation (Booth 132) Conditioning equipment. Company will exhibit its automatic H-W Conditioner for twist setting, lofting and regain. The conditioner will be equipped with damper control so that it will be possible to automatically pre-heat, condition and dry or exhaust at the end of the operating period.

Personnel in attendance: R. G. Leininger, P. H. Friend, F. W. Caesar, J. R. Tutt.

International Silk Association (U. S. A.), Inc. (Booth 57) The display will consist of fabrics and dresses of circular knit silk jersey, Milanese, silk sweaters and knit dresses, silk knit ties, silk tricot fabrics.

Personnel in attendance: Walter Strassburger, George Elbogen, Hans Vaterlaus, Miss Ree De Veaux, Aubrey Kelly.

International Textile Machine Co. (Booth 819).

Interstate Textile Equipment Co. (Booth 158).

Ives Co., Inc., Loyal T. (Booth 837) Knitting needles.

Jet Age Knitwear Machinery Corp. (Booth 225) Knitting machinery. Display will cover five machines—four Philip circular units and the Walter Weiffenbach fully automatic double lock V-bed flat power machine. The four Philip machines will consist of: (1) Philip fully automatic, multi - section spring beard needle combination rib and jersey full-fashioned sweater machine, with rack start and draw thread separation; (2) Philip multi-feed, multi-purpose, fully automatic circular sweater-strip machine with selective transfer, links and links, jacquard and controlled rack of one or more dial needles in any part of the machine; (3) Philip super multi-feed, 33-inch diameter, 48 feed, jacquard double jersey, pique machine, non-spiral design patterns; (4) Philip super multi-feed, 33 inch diameter, 48 feed, interlock sweater-strip machine.

Personnel in attendance: Morris Kaplan and Philip Belaief.

Johnston Mills Company (Booth 706) Knitting yarns. Combed, carded and Durene yarns, both natural and dyed, will be shown. Personnel in attendance: David R. Johnston, Donald R. Jonas, Eddie E. Jones Jr., W. J. Crummer, R. M. Bechtel, F. N. Belk, H. M. Byrne, Philip Gesoff, A. R. Newcombe Jr., E. M. Peacock, W. B. Phelps Jr. and W. J. Yates.

Jordan Spinning Company (Booth 613) Knitting yarns. Display will consist of single and plied mercerized and package dyed combed cotton knitting yarns of domestic, Egyptian and Pima cotton. In addition, yarns containing blends of nylon and combed cotton, stretch nylon and wool, and stretch nylon and cotton combinations. Frank Longerier, sales manager, will be in attendance.

Kemfast Textiles, Inc. (Booth 610) Dyers. Display will consist of package dyed yarns of Orlon, Orlon Sayelle and other fibers. Also on display will be knitted dresses made of package dyed wool in the new double knit fabrics.

Personnel in attendance: Cy Girard, Herbert Girard and Murray Catin.

Keystone Dyeing Company (Booth 1019) Dyers.

Kidde Textile Machinery Corp. (Booth 39) Warp knitting machinery.

Kirsten, Inc., Olaf R. (Booth 1027).

Klauder Weldon Giles Machine Company (Booth 947) Dyeing equipment. Machines that will be featured include a 200-lb. KWG-Duo-Flo circulating type skein dyeing machine, a 100-lb. paddle wheel dyeing machine, a yarn carrier dyehouse truck and a circulating machine yarn rack truck.

Personnel in attendance: Thomas Bell, Robert Bell and John Rascher.

Klein & Co., John (Booth 755).

Klumpp Co., Joseph (Booth 414) Knitting yarns. Carded, combed and Durene cotton yarns will be displayed in addition to metallics and other specialty yarns.

Personnel in attendance: J. J. Klumpp, G. L. Vonder Lindt, Wallace Gill Jr., Carl H. Beitel, Erwin M. Aptaker, Philip Nathanson, John Tenwolde.

Knitrol, Division of Uster Corporation (Booth 1029).

Knitting Machine & Supply Co. (Booth 315) Knitting machinery.

Kopelowitz, Inc., Joseph (Booth 855) Knitting machin-

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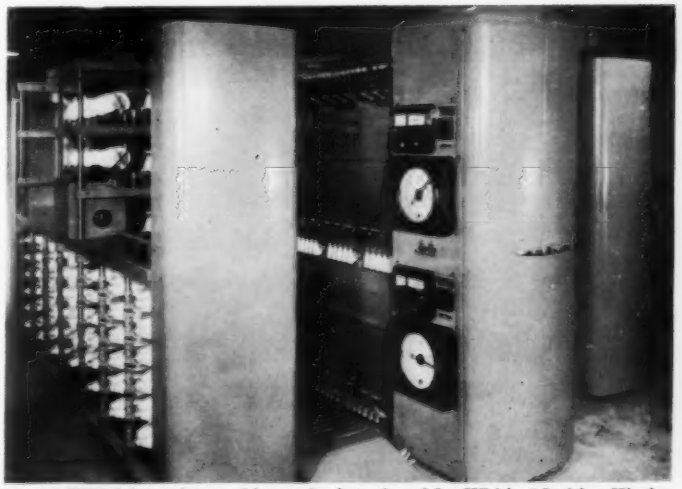

Model FTF false twist machine to be introduced by Whitin Machine Works.

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Hotter
HOTTEST

Laminating — *by experienced knit goods dyers and finishers*

LAMINATE ASSOCIATES, INC. 68 3rd Street Brooklyn 31, N. Y. TR 5-0986

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ery. Two Spanish V-bed flat machines, the Mestre Models H-L and H-L-J will be exhibited for the first time.

Model H-L is equipped with high and low needles in the front and back bed. Model H-L-J is equipped with high and low push jacks in front and back bed which vastly increases pattern possibilities and pattern combinations. Jacks are easily controlled by cams on carriage.

Personnel in attendance: Larry Kopelowitz, Joseph Kopelowitz and Jo Van der Linden.

Laconia Cooper Sales Corp. (Booth 732) Knitting needles, jacks and sinkers.

Lamb Knitting Machine Corp. (Booth 934) Knitting machinery.

Laminate Associates, Inc. (Booth 2) Laminators, dyers and finishers. Exhibit will contain various types of fine and coarse gauge knitted fabrics laminated to polyurethane foam.

Personnel in attendance: Philip Rubin and Max Millman.

Lassiter Corp. (Booth 619) Packaging machinery.

Latta, Currier Co., Inc. (Booth 66) Knitting yarns. Yarns of the following companies will be displayed: Bowling Green Spinning Company, Gastonia, N. C., manufacturer of 18s through 30s combed knitting yarns; Cheraw Cotton Mills, Cheraw, S. C., spinner of 8s through 20s carded knitting yarns; Cashmere Corp. of America, Ltd., Cleveland, Ohio, producers of high quality woolen spun yarns utilizing primarily precious fibers; Fitchburg Spinners Sales Corp., Fitchburg, Mass., spinner of Turbo Orlon, high-bulk Orlon, Acrilan and blends in a wide range of counts for the knitting trade; Roselon Yarns, Inc., division of Rose Mills, Inc., Phila., Pa., manufacturer of Textralized yarns; Sterling Cotton Mills, Inc., Franklinton, N. C., producers of carded knitting yarns in a range of 22/1 through 30/1; Swans, Inc., Hillsboro, N. H., manufacturer of woolen spun yarns such as 100 per cent Orlon, lamb's wool and Orlon and 100 per cent Shetland.

Personnel in attendance: Albert W. Latta Jr., Arthur M. Currier, William F. Durkin, Frank W. Sundberg, Ray W. Williams, Sven L. Nordin, Dan S. LaFar, William Manning Malloy, Shiah M. Arsham, M. Fred Thoma, Edwin J. Lyman, A. Gordon Adams, Elwood W. Munz, John A. Moore and R. C. Swan.

Laurel Soap Manufacturing Co., Inc. (Booth 713) Textile chemicals. Exhibit will consist of a series of lubricating and conditioning emulsions and trough solutions for all natural and synthetic fibers and yarns; processing compounds for men's and ladies' hosiery; soap; softeners; flame retardant and water repellent finishes; and a complete line of package dyeing assistants and finishes.

Featured will be Metrosol RX and Catamine SF for washing wool and Orlon sweaters, new softeners for natural and dyed yarns; new emulsion lubricants for knitting yarns; and Polylube FFN, a new, improved finish for nylon and Dacron warp knit and resin finished fabrics.

Personnel in attendance: Clarence E. Bertolet, president; William H. Bertolet Jr., A. Henry Gaede, William H. Bertolet 3rd, Albert H. Rant, J. Paul McGinty, Fowler Jackson, Joseph J. Murphy, Philip B. Hudson.

La Venus Hosiery Company, Inc. (Booth 1043).

Leatex Chemical Company (Booth 100) Textile chemicals. Exhibit will consist of chemical processing assistants for knitting, bleaching, scouring, dyeing and finishing of knitted textiles.

Personnel in attendance: Maurice M. Guertin, L. Kevin McChesney, Troy F. Robbins, Joseph A. Clark, Harry Buckley, Samuel J. Guertin, John F. Rieder, John McChesney Jr.

Leesona Corporation (Booth 547) Winding equipment. A new large package ring twister called the No. 512 will be demonstrated. The ring twister features a 12-inch traverse and a completely new, high speed traverse motion. A new builder motion provides a superior package construction, giving exceptionally free delivery in the next operation. Ring rail construction has been engineered to provide exceptionally smooth traverse motion at high speeds —up to five rpm of the builder

(*Continued on Page* 61)

WHY PAY TOO MUCH FOR TOO LITTLE

The difference in cost between making a sweater well or making it poorly is surprisingly small.

But the difference in skill necessary to produce a superior garment is great.

Over a period of forty-eight years, our people have acquired this skill by constant effort and encouragement to do a good job better.

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Designers and Creators of High Quality Sweaters and Sweater Shirts for Men

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EMPIRE RESEARCH PERFECTS NEW TROUBLE-FREE "ORLON SAYELLE" DYEING TECHNIQUE

only EMPIRE *guarantees*

1. 100% return, no waste dyeing
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3. Brilliant new color fidelity

Empire's exclusive new Sayelle dyeing process... another product of Empire research!

If you're dealing with synthetic yarns, high bulk or turbo orlons, it will pay you to investigate Empire's superior technical services. Now you are guaranteed 100% waste free — trouble free package dyeing in Empire's magnificent new plant. What is more, Empire's brilliant color reproduction is often mistaken for skein dyed products, a further tribute to Empire's 27 year tradition of dyeing excellence.

†"Orlon Sayelle" is Du Pont's trademark for its bl[illegible] acrylic fiber.

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EMPIRE *yarn dyers*

717 South 3rd Avenue, Mount Vernon, N. Y.

motion cam, and a new spindle and swing combination allow high spindle speeds with a large 12-inch traverse bobbin. The ring twister is expected to be of particular interest to throwsters and knitters because of the improved package and yarn quality. Display will also include exhibits of new textured yarn fabrics and yarn packages.

Personnel in attendance: E. P. Barrie, F. J. Barrows, J. Bowler, J. R. Breen, L. E. French, K. H. Gibson, H. D. Kernan, R. Leeson, R. P. Newell, E. C. Parish, R. S. Pennock, H. H. Richardson, C. E. Sullivan, R. H. Wallace, J. J. White.

Legge, Percy A. (Booth 651) Knitting yarns. Reception booth and display of yarns from the following mills: The Allendale Company, Argonne Worsted Company, Bear Brand Hosiery Company, Firestone Rubber & Latex Products Co., Worcester Textile Co., Bonin Spinning Company, Concordia Mfg. Co., Inc.

Personnel in attendance: C. H. Vanderbeck, Henry C. Legge, Richard S. Rosenfeld, Oliver L. McCurdy, A. Rex James, G. L. Wagoner, Webster Smith, Neil MacLellan and T. W. Adams.

Leon-Ferenbach, Inc. (Booth 957) Knitting yarns. The exhibit will consist of filament yarns and products knitted and woven from these yarns.

Personnel in attendance: Carl Ferenbach, John C. Ferenbach, Richard S. Ferenbach, William T. Swoyer Jr., Robert D. Taylor, Robert L. Wise, Edmond A. Ambrogi, Howard D. Godfrey, David W. Gott, William Griffin, Robert J. Mebane, Charles W. Wolcott.

Liberty Throwing Co., Inc. (Booth 728) Throwsters. Spandex fibers covered with rayon, nylon and cotton for swimwear and foundation garments will be shown. In addition, for the swimwear field Liberty will show a wide range of special colors in the form of high yardage cotton covered rubber threads which have shown uniquely good sun fastness, washability and chlorine resistance.

Personnel in attendance: Charles M. Epstein Jr., George M. Poillon, John D. Sicher, Edward J. Chernesky.

Lidz Brothers, Inc. (Booth 831) Buttons. All styles of buttons suitable for knitwear will be exhibited. Personnel in attendance: Edward Lidz, Murray Cohen, Al Sjursen, Peter DeAngelis.

Liebers & Co. (Booth 1021) Knitting needles. The display will consist of flat stock for all types of knitting machines, including sinkers and split dividers, jacks and knocking over bits for full-fashioned hosiery machines and complete sinker heads and knocking over bars. Also sinkers, transfer jacks and cylinder jacks and pattern jacks and drum jacks for ladies' circular hose machines, including sliders, sinkers, sinker bluffs for Komet machines and sinkers, etc., for Wildman and Supreme machines, and guides for tricot machines.

Personnel in attendance: Peter Liebers, Gerhard Fischer and H. Walter Fricke.

Markem Machine Company (Booth 628) Labeling equipment. Markem will feature its new Model 152-A automatic hosiery box marker for the first time. Other standard models to be displayed include the Model 126-C label printer, Model 45-A box printer, and Model 32-AD piecework ticket printer.

Personnel in attendance: Leon Graves, Thomas H. Hugguns, Charles H. Cheeseman, Harris E. Clark, Charles E. Zahos.

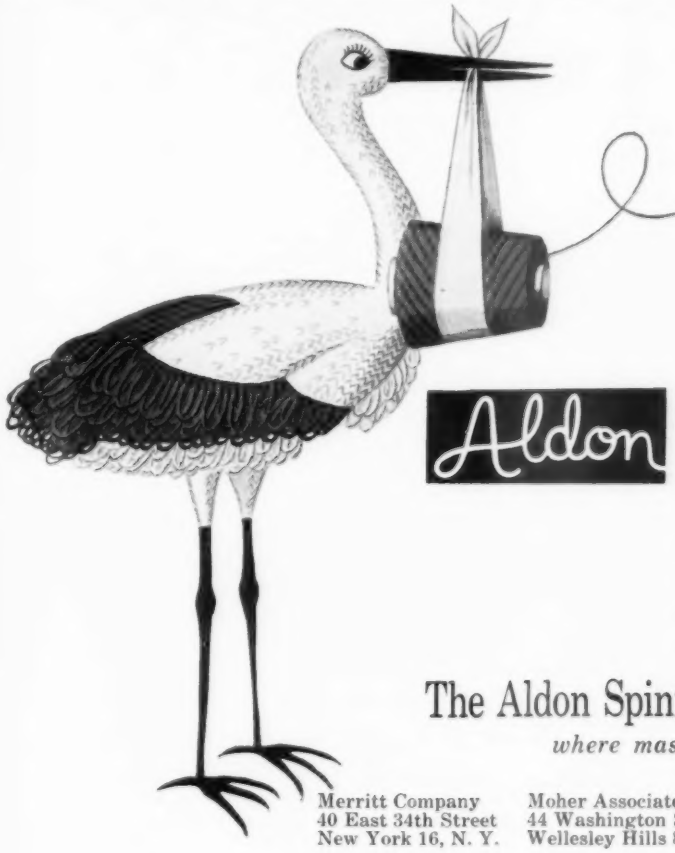
Marley Distributing, Stanford (Booth 164).

Marvel Specialty Company, Inc. (Booth 308) Quality control and general equipment. Products to be shown will be Marvel mending machine with iron attachment, Marvel-Meter, Marvel StaX, ALSiMag ceramic throat plates for Fidelity and Scott & Williams 400 Needle Machines, Olcott hosiery carrying trays.

Personnel in attendance: Grayson Harralson, Gus T. Smith, Lew Ballard, Hubert Hurley and Carl McAnally.

Mason Silk, Inc. (Booth 1028) Sewing thread. Products to be exhibited include nylon and Dacron Stitchlok sewing thread, conventional nylon and Dacron sewing thread, nylon quilting thread and nylon bobbins; also

(*Continued on Page* 63)



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— the mill with a feeling for fibers

has the imagination, skill, and versatility that creates the truly new! Applying new formulas to the newest in fibers, Aldon wool-spun yarns are produced with classic craftsmanship . . . for new beauty and time-honored quality. Call on Aldon for the newest — you'll be glad you did.

The Aldon Spinning Mills Corp. Talcottville, Conn.

where master spinners create the unusual

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EXCLUSIVE DISTRIBUTOR FOR THE WORLD'S FINEST TEXTILE MACHINERY!

ILMA Skein dyeing, Package dyeing, Beam dyeing, continuous Top and Tow dyeing machines

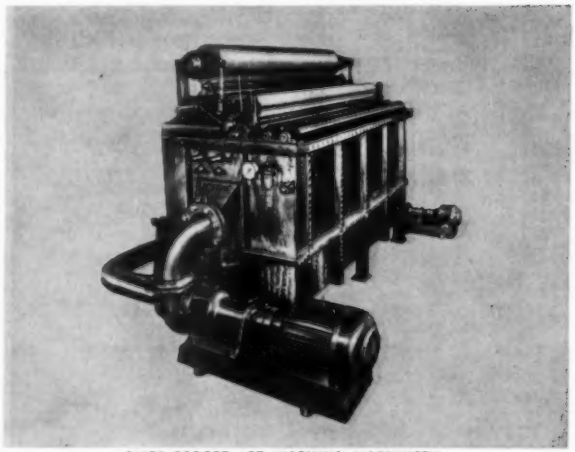
Mario Crosta Napping, Shearing, Rotary presses, Carpet shears, Teazling — both natural and metallic

OMEZ Open width forced jet washing machine and material handling for cloth in process

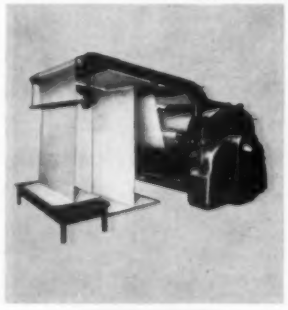
SAVIO Winders, Skein-to-cone, Dye package, and Cone winders

G. SPEROTTO Continuous decating machines for woolen and tubular knit fabrics

FL Meccanotessile COMO Automatic screen printing, Skein, mercerizing and washing machines



OMEZ FORCED JET WASHING MACHINERY



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nylon and Dacron industrial threads. The nylon and Dacron Stitchlok threads are produced from a patented process. The continuous filaments have surface characteristics of cotton due to the thousands of microscopic loops formed in the thread. The Stitchlok threads are claimed to be applicable to knitted garments of Ban-Lon textured yarns.

Personnel in attendance: H. Eugene Mason, G. Frederick Buzzard, William H. Chase Jr., John M. Miedwig Jr.

Mayer Textile Machine Corp. (Booth 747) Knitting equipment. The new Super-Rapid K-2 tricot machine, 168 inches wide, 28-inch gauge, two guide bars will be demonstrated. This machine incorporates as its main feature a single crank shaft drive as opposed to our conventional cam shafts. Also on display will be a new Raschel rubber knitter featuring a crank shaft drive as opposed to the conventional cam shaft.

Personnel in attendance: Nat Brody and Helmut Nittman.

Mehl Manufacturing Company (Booth 910) Packaging machinery. The display will consist of the new MA packaging machine, the F garment bag making machine, the ST-4 bench model packaging machine and the Shrink tunnel and conveyor for tight-wrap packaging.

Personnel in attendance: A. H. Schrage, A. Vaicunas, William J. Sachs, L. A. Tishler, Leon Fertig, William Buzek.

Merrow Machine Company (Booth 135) Sewing equipment. The display will consist of new model Merrow overstitch machines for underwear and outerwear. Included will be Style M-4D-45 for men's and ladies' hose; also Style M-3DW including a heavy duty, four-thread overstitch machine for outerwear.

Personnel in attendance: J. M. Washburn, president; W. M. Baker, treasurer, and Jack Washburn.

Meyers & Co., Clarence L. (Booth 533) Knitting yarns.

Milton Machine Works, Inc. (Booth 735).

Monarch Marking System Co. (Booth 710).

Montrose Supply & Equipment Co. (Booth 1024) Miscellaneous equipment. On display for the first time will be the following equipment: (1) Sandt hydraulic die cutting machine—that will cut knitted cloth into sleeves and bodies of sweaters; (2) Kuris band cutting machine; (3) automatic string machine; (4) automatic pom-pom machine. Also on display will be knitting machine supplies, including replacement springs, brushes, porcelains, control cords and gears.

Personnel in attendance: Fred B. Muchnick, Jerome Muchnick, Fred Kessler, Louis Haberman.

Morgan Dyeing & Bleaching Co. (Booth 512) Dyers. Display will be devoted to skein and package dyeing of yarns and the dyeing of staple. Continuous showing of a film on yarn dyeing developed by Harry Millson of American Cyanamid Company will be shown.

Personnel in attendance: I. A. Rolfe, president; Harry F. Loefgren, vice president of sales, and George Gaede, eastern sales manager.

Muller & Co., L. P. (Booth 507) Knitting yarns.

Namm and Singer (Booth 23).

Narrow Fabric Company (Booth 513) Elastic fabrics. The display will consist of elastic and non-elastic products, produced on weaving, knitting, lace and braiding machines. Attention will be given to fabrics suitable for swim suits containing Spandex yarns.

Personnel in attendance: S. R. Fry, T. P. Handwerk, F. S. Pierce, O. E. Huber, T. M. Fry, K. R. Lieb, S. S. MacCallum, H. V. Vernet Jr. and O. A. Kemp.

National Industrial Machinery Corporation (Booth 433) Knitting machinery. Lonati twin feed ladies' seamless knitting machines will be demonstrated producing plain, mesh and stretch hosiery. J. N. Bogoff, president, will be in attendance.

National Spinning Company, Inc. (Booth 1006) Knitting yarns. Display will consist of garments and fabrics made of worsted, zephyr, Mohlan, nylon, Turbo Orlon, Spun-Gee, Ban-Lon, Yama, Natura, Acrilan, Vybran, Amora and Sayelle. Also to be exhibited are some

(*Continued on Page* 65)

The *Important* Factor....To Remember

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WE WELCOME YOUR INQUIRIES

Franklin
COLORBRED YARNS

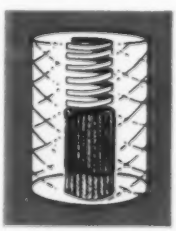
THEY PROVE THEIR QUALITY HERE

If your cones are not properly wound; if your yarn is not properly softened, you lose money at the knitting machine.

With a half century of experience in serving the knitting industry, with unequalled yarn dyeing and winding capacity, and with a superior technical staff, we can assure you of properly wound cones and of yarns softened with our special knitting finish.

And don't overlook the quality of Franklin Dyeing. Wound on Franklin Springs exclusively, our dye packages are compressible. Soft packages compress more and hard packages compress less into a column of uniform density. Uniform penetration of dye liquor and uniform shades consistently follow.

Our representative is at your service. Contact our nearest plant or office and ask him to call.



X-ray view of Franklin Package — the "secret" of uniform shades. Don't say "package dyed". Say . . . "FRANKLIN COLORBRED"

Franklin Process
COMPANY

Largest Package Dyers in the World of Natural and Synthetic Fibre Spun Yarns

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Philadelphia Office — Howard & Clearfield Streets
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368-D

of these yarns in the natural and dyed state on skeins and cones.

Personnel in attendance: Phillip Leff, Carl Leff, Joseph Leff, Joseph Freeman, Morgan Miller, Irving Lopatey, Norman Lynn, Milton Levy, Hyman Schwartz, Robert Greenfield, John Church and Howard Bergman.

National Vulcanized Fibre Co. (Booth 915) Materials handling. Exhibit will consist of constant level truck with a two-position lock down unit, a metal truck that carries fiberglass boxes for use in hosiery mills and a number of other metal, fiberglass and fiber specialties.

The company's Lestershire Division will feature an assortment of new brazed aluminum spools and bobbins. One and two pound take-up bobbins, rubber covering spools and a new Model 10 twister bobbin will be shown along with Lestershire's large assortment of fiber and wood spools and bobbins.

Personnel in attendance: E. B. Burnley, G. M. Hutchinson, J. G. Fisher, H. E. Matych and D. E. Williams.

Old Dominion Box Co. (Booth 1001).

Ordnance Gauge Company (Booth 729) Knitting machinery.

Paramount Textile Machinery Co. (Booth 237) Finishing equipment.

Parizek Manufacturing Co., Frank (Booth 162) Buttons. Display will consist of self shank and sew-through buttons of thermosetting polyester and molded plastic compounds. In addition, the company will demonstrate its automatic self shank button attaching devices.

Personnel in attendance: George R. McAlister and Joseph C. Wiener.

Pellon Corporation (Booth 213) Non-woven fabric. The company will show the latest Pellon non-woven shaping materials and Pelomite non-woven laminating materials. A new non-woven tear-away material for use on embroidery machines will be introduced.

Personnel in attendance: Harold Boiman, Mac Wolff and Steve Elstein.

Pernick Co., Inc., Joseph (Booth 805) Finishing equipment. The display will consist of calenders for double knit fabrics, slitting, opening and gumming machines, and slitting machinery for preparing tubular fabrics for lamination. A 72-inch measuring and examining machine for use on all types of fabrics will also be shown.

Personnel in attendance: David Pernick, Mark Pernick, David Haft and Peter Haft.

Pharr Worsted Mills, Inc. (Booth 49) Knitting yarns. Display will consist of the various Pharr worsted, zephyr and synthetic yarns.

Personnel in attendance: W. J. Pharr, W. J. Pharr Jr., George M. Howe, J. Crawford Poag, Martin Carstarphen, Dayton Larzelere, Joseph T. Manning 3rd, Gordon F. Bottomley, Edwin L. Dale, John L. Dale, Louis C. Clelland.

Piedmont Processing Co. (Box 532).

Queens Machine Corp. (Box 120) Knitting machinery.

Reece Corporation (Booth 825) Sewing equipment. The display will consist of the following machines: S-2 buttonholer; S-2 edge finisher; S-2 tacker; 101 cord trim; 101 adjustable fly bar; 101 cross oval; a pocket welt machine; piped buttonhole machine.

Personnel in attendance: J. H. Pikul, O. F. Christiansen, D. R. Toran, W. F. Taylor, F. E. Morris, F. O. Paul, P. Hargadon, Al Hart, Ed Wolfe, Mr. Morici, J. L. Cruden, R. A. Learmonth, J. W. Ebrite, George Eberwine Jr., L. Marvin, M. Messina.

Reiner, Inc., Robert (Booth 901) Knitting machinery. Two Schaffhausen V-bed flat machines and Liba two and three bar tricot machines will be displayed.

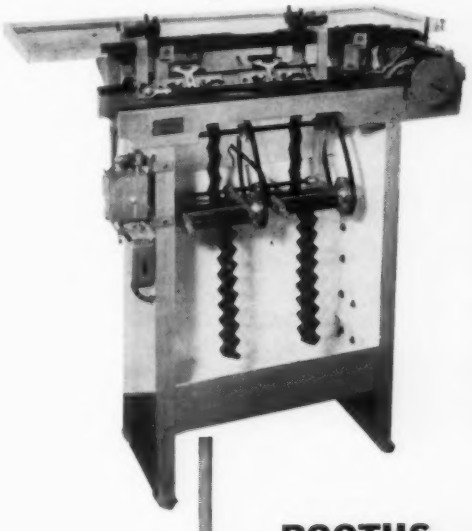
The Schaffhausen units are the Models DOFA, a three-cut 63-inch V-bed double lock machine, and DOFU, a 12-cut double lock automatic transfer machine.

Refined Products Co. (Booth 1001-A) Textile chemicals. The display will consist of knit goods finished with the company's compounds and resins including Kara Set wash and wear finish for knitted outerwear and swimwear.

Personnel in attendance: B. H. Bossidy, A. J. Ramunda, Dr. D. M. Musser, George Fine,

(*Continued on Page* 71)

MODEL VS 100-3
for 2 or 3 Color Trimmings
for 4 or 6 Solid Color Trims



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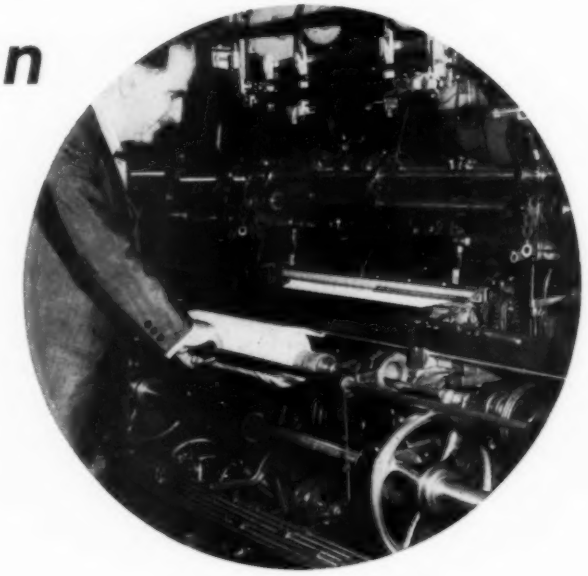
Now Accepting Orders For

PHILIP MULTI-SECTION *Full-Fashion Sweater Machines*



The Only Complete Fully-Automatic Full Fashion Machine Available Today.

- Only the Philip Advanced Design Full Fashion machine is capable of changing from rib to jersey knitting and vice versa as often as desired with separating draw thread and rack start continuously in a single operation.
- The Philip Full Fashion machine eliminates the separate knitting of rib bottoms and cuffs on V-bed machines as well as the time-consuming operation of separating, topping and transferring.
- In addition, the machine can be equipped to produce intarsia, lace and pique and still operate fully automatic without any interference.
- One man will be able to operate 40 heads, instead of the 8 to 10 people required on competitive machines — (taking into consideration the knitting of bottoms and cuffs on the V-bed machines, separating them, topping them and transferring them onto the full fashion machines — the knitters required to operate the full-fashion machines and the supervisors required to coordinate the bottoms and cuffs with the bodies and sleeves, and the allocation of the yarns to each to avoid mixing up lots).
- Philip simplifies the entire full-fashion knitting operation by eliminating all preliminary stages. You simply tie up the yarns and proceed to knit the complete garment.
- ***With the Philip full fashion machine you save the capital investment and space required for bottom and cuff machines and topping bars.***

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PHILIP *All-Purpose*
Circular Sweater Strip Machine
30" DIAMETER, 20-24 FEED, 4-12 CUT

IT IS EQUIPPED:

- ✓ ***WITH THE PHILIP DOGLESS FRAME THAT WORKS ON A NEW PRINCIPLE FOR A REVOLVING HEAD MACHINE WHICH GIVES IT A POSITIVE HOLD, ALSO MAKES IT MORE ACCESSIBLE AND SIMPLIFIES THREADING OF THE YARNS.***
- ✓ **WITH THE PHILIP PATTERN WHEEL MULTIPLIER THAT INTRODUCES A NEW CONCEPT IN JACQUARD PATTERNING, MAKING IT POSSIBLE TO INCREASE THE PATTERN DESIGN MANY FOLD AND KNIT THE DESIGNS IN 2, 3, OR 4 COLORS STRAIGHT ACROSS THE FABRIC WITHOUT SPIRAL OR BIAS EFFECT.**
- ✓ ***ANY ONE NEEDLE, OR A GROUP OF NEEDLES, IS CAPABLE OF RACKING ON EACH FEED INDEPENDENTLY WHILE THE MACHINE IS OPERATING AT FULL SPEED. THE NEEDLE RACKING ARRANGEMENT MAKES IT POSSIBLE FOR THE PRODUCTION OF RACKED DESIGNS IN THE FORM OF JACQUARD-SHAPED EFFECTS: DIAMONDS, PANELS, DIAGONALS, ETC.***
- ✓ **THE JACQUARD DESIGN OR PATTERN CAN BE KNITTED THROUGHOUT THE FABRIC TO A DESIRED HEIGHT AND THEN CHANGED AUTOMATICALLY TO A NEW EFFECT IN A SELECTED PORTION. THE REMAINDER OF THE STRIP CAN BE SOLID OR CHANGED TO THE SAME WELT BACKGROUND AS THE JACQUARD. THIS MEANS THAT YOU CAN INCORPORATE ALL THE DIFFERENT VARIATIONS OF STITCHES AND DESIGNS IN A SINGLE SWEATER STRIP.**
- ✓ ***DOUBLE TRANSFER FROM CYLINDER TO DIAL AND DIAL TO CYLINDER WHICH ENABLES SAME TO PRODUCE A REGULAR LINKS PURL STITCH.***
- ✓ **STRIPING IS DONE BY A SIMPLE FEED CONTROL.**
- ✓ ***ALL KNOPPEN, HALF AND FULL CARDIGAN STITCHES WITH OR WITHOUT RACKING.***
- ✓ **EYELET FABRICS WITH WIDE OPENINGS.**
- ✓ ***SELECTIVE TRANSFER.***
- ✓ **INTERLOCK AND DOUBLE JERSEY CONSTRUCTIONS.**
- ✓ ***1 X 1 AND 2 X 2 RIB BOTTOMS WITH RACK START.***
- ✓ **4 INDEPENDENT STITCH SETTINGS TIGHT TO LOOSE ON EACH FEED AUTOMATICALLY CONTROLLED ON CYLINDER AND DIAL. IF THE STITCH TIGHTENERS ARE IMPROPERLY SET THEY WILL CORRECT THEMSELVES AUTOMATICALLY AT THE END OF EACH BODY STRIP.**
- ✓ ***THE CYLINDER SECTIONS HAVE 3 RACEWAYS. IN THE TOP RACEWAY THE NEEDLES ARE ACTUATED BY THE PATTERN WHEELS. THE MIDDLE RACEWAY OPERATES THE SHORT NEEDLES. THE BOTTOM RACEWAY OPERATES THE LONG NEEDLES. EACH NEEDLE HAS A HIGH AND LOW BUTT PLUS AN EXTRA BUTT FOR FUNCTIONING OF THE PATTERN WHEELS.***
- ✓ **THE MACHINE IS EQUIPPED WITH ONE CONTROL DRUM WHICH CONTROLS EACH FEED INDEPENDENTLY WHILE THE FIRST CHAIN IS ON A LOW LINK. AS SOON AS IT MOVES ONTO A HIGH LINK THE DRUM STOPS COMPLETELY UNTIL THE FIRST FEED, WHICH FUNCTIONS AS A COUNTER, ARRIVES AND CAUSES THE CHAIN TO MOVE ONE LINK. IF CHAIN IS STILL ON A HIGH LINK THE ACTION REPEATS ONCE AT EACH COMPLETE REVOLUTION. WHEN THE MOVEMENT IS MADE ONTO A LOW LINK, THE CHAIN MOVES AGAIN AT EACH FEED. THIS MEANS THAT THE DRUM TIMING WILL CORRECT ITSELF AT EACH REVOLUTION IF IT IS IMPROPERLY SET.**
- ✓ ***THE MACHINE IS SO COMPLETELY AUTOMATIC THAT TO ALTER PATTERNS OR FABRIC CONSTRUCTION YOU SIMPLY CHANGE CHAINS AND ADJUST PATTERN WHEEL.***

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See This Machine At Booth 225 — Knitting Arts Exhibition — Atlantic City — April 24-28, 1961 JA-11

PHILIP *Double-Jersey,* Jacquard Yardgoods Machines

MODEL PSDJJ

REVOLVING YARN STAND
33" DIAMETER, 48 FEED, CUTS UP TO 18 NEEDLES PER INCH

IT IS EQUIPPED:

WITH THE PHILIP DOGLESS FRAME THAT WORKS ON A NEW PRINCIPLE FOR A REVOLVING HEAD MACHINE WHICH GIVES IT A POSITIVE HOLD, ALSO MAKES IT MORE ACCESSIBLE AND SIMPLIFIES THREADING OF THE YARNS.

WITH THE PHILIP PATTERN WHEEL MULTIPLIER THAT INTRODUCES A NEW CONCEPT IN JACQUARD PATTERNING, NOW MAKING IT POSSIBLE TO INCREASE THE PATTERN DESIGN MANY FOLD AND KNIT THE DESIGNS IN 2, 3, OR 4 COLORS STRAIGHT ACROSS THE FABRIC WITHOUT SPIRAL OR BIAS EFFECT.

PRODUCES A COMPLETE RANGE OF FABRICS WITHOUT USE OF THE PATTERN WHEELS:

• CHECKERED AND PLAID DESIGNS • RIB • SINGLE PIQUE • DOUBLE PIQUE • CARDIGAN • 1 X 1 OR 2 X 2 INTERLOCK • EIGHTLOCK • BOURRELET • SWISS OR FRENCH TIMING • TRIMMINGS IN ALL OF THE ABOVE STRUCTURES WTH A DRAW-THREAD SEPARATION AND A WELT START

All Cams on the Machine Are Individually Adjustable For Knitting, Welting, or Tucking.

THIS MODEL IS AVAILABLE FOR FUTURE DELIVERY FOR THE PRODUCTION OF SWEATER STRIPS INCORPORATING A RIB BOTTOM, WELT START AND DRAW THREAD SEPARATION, EQUIPPED WITH INDEPENDENT TIGHT AND LOOSE STITCH AUTOMATICALLY CONTROLLED.

MODEL PDJJ

STATIONARY YARN STAND — PHILIP DOUBLE JERSEY JACQUARD YARDGOODS MACHINE — 33" DIAMETER, 48 FEED, CUTS UP TO 18 NEEDLES PER INCH.

THE PHILIP PATTERN WHEEL MULTIPLIER INTRODUCES A NEW CONCEPT IN JACQUARD PATTERNING, NOW MAKING IT POSSIBLE TO INCREASE THE PATTERN DESIGN MANY FOLD AND KNIT THE DESIGNS IN 2, 3, OR 4 COLORS STRAIGHT ACROSS THE FABRIC WITHOUT SPIRAL OR BIAS EFFECT.

PRODUCES A COMPLETE RANGE OF FABRICS WITHOUT USE OF THE PATTERN WHEELS:

• CHECKERED AND PLAID DESIGNS • RIB • SINGLE PIQUE • DOUBLE PIQUE • CARDIGAN • 1 X 1 OR 2 X 2 INTERLOCK • EIGHTLOCK • BOURRELET • SWISS OR FRENCH TIMING • TRIMMINGS IN ALL OF THE ABOVE STRUTURES WTH A DRAW-THREAD SEPARATION AND A WELT START

ALL CAMS ON THE MACHINE ARE INDIVIDUALLY ADJUSTABLE FOR KNITTING, WELTING, OR TUCKING.

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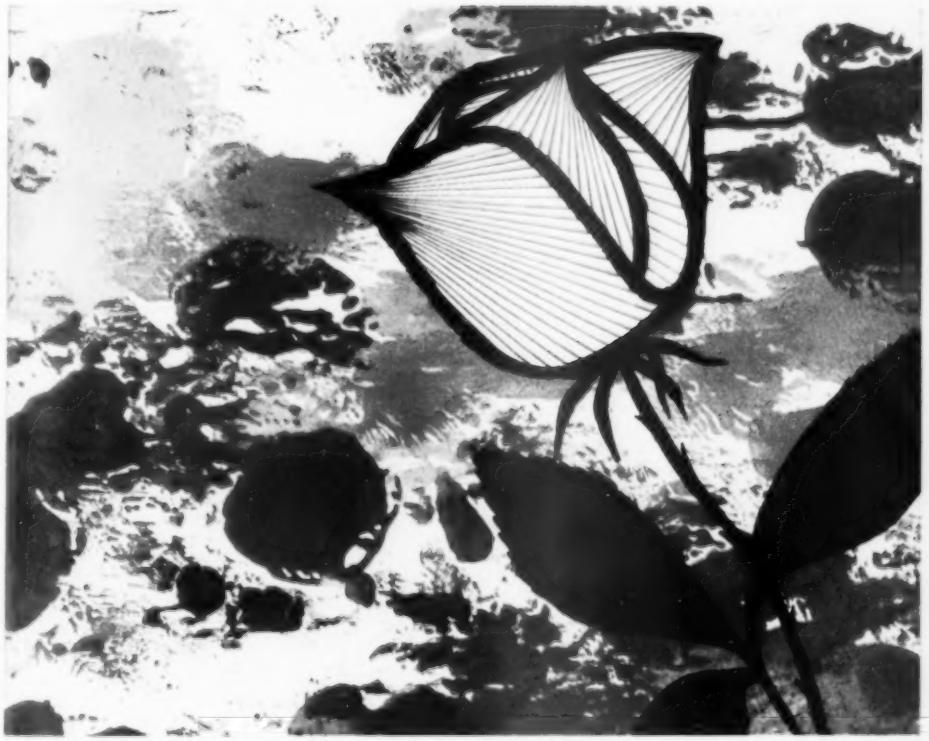

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Philip Patented Trouble-Preventing Design Assures Full-Time Profit-Knitting Ability.

No striping boxes, **no** scissors, **no** movable cams required to change from rib to interlock and back again. Yarn is moved from odd to even feeds and back simply by lifting yarn carriers out of contact with needles. You get continuous output without slowdown for changes.

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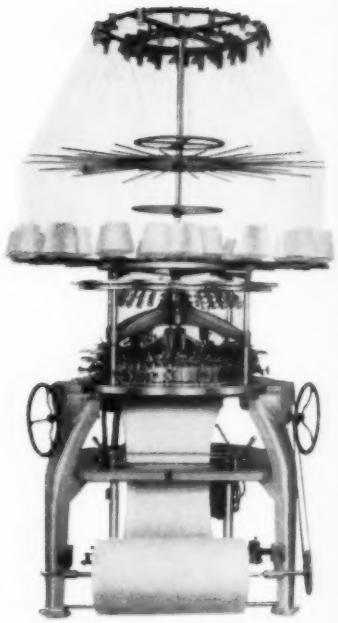

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Samuel Van Haste, Joseph Birch, George Maynard, George Purdy, Walter Comer.

Reliable Attachment Company (Booth 1016).

Reliable Machine Works, Inc. (Booth 726).

Rhodia, Inc. (Booth 205) Synthetic fibers. Rhoyvl polyvinyl chloride fibers and knitted articles made from these fibers will constitute this company's display. L. Hochstaeder, sales and merchandising manager, will be in attendance.

Richmond Oil, Soap & Chemical Co., Inc. (Booth 267) Textile chemists. A complete line of textile chemical specialties for spinning, coning, knitting, scouring, dyeing and finishing of all types of yarns and fabrics will be shown. Features of the exhibit will be the company's Rubberknit oils for rubber thread and yarns to prevent their degradation, various coning lubricants for use on Textralized yarns, textured yarns, seamless hosiery welt yarn, new scouring and softening agents for various types of knitted outerwear.

Personnel in attendance: William Alkus, Morton W. Levi, John W. Schenkel, James W. Lederer, Noel Fawcett, Richard L. Fawcett.

Rochester Button Company (Booth 906) Buttons. The company will exhibit its line of shank buttons and the two and four hole variations in a complete color and size range. An added feature will be a group of buttons with the new textured look, created for town and country fashions.

In addition, the new So-Thru button feeder will be shown and demonstrated for the first time. This unit is specially designed for automatic feeding of two and four hole buttons. It utilizes a new concept in design for automation and is suitable for use with all popular button sewing machines. Also to be demonstrated will be Rochester's latest model of the Speed Feed shank button feeder.

Personnel in attendance: Bernard Popkin, Harold Hasin, Robert Udowitch and Gunther Scheibert.

Rosenthal & Rosenthal (Booth 154) Factors.

Rothkopf and Co., Inc., Mac M. (Booth 763) Knitting machines and knitting needles and attachments. Three circular knitting machines from Mayer & Cie., West Germany, will be displayed in addition to a 63-inch fully automatic V-bed machine called the McRoth ATR. The Mayer machines on display will consist of the Jacquard Overnit II Machine, a circular yardgoods machine capable of knitting double jersey, jacquard relief, non-spiral designs, etc.; Model Suprint, a multi-feed interlock machine capable of knitting separation, double pique and fancy colorful patterns; and Bellarib II, a high production underwear fabric machine capable of producing plain and pattern fabrics. In addition, the display will consist of a full line of McRoth-Lebocey needles.

Personnel in attendance: Mac M. Rothkopf, Gene A. Rothkopf, Abe Rothkopf, Sid Ginness, Sam Belaief, Arthur Trenholme and P. B. Couste.

Salmon, Kurt Associates, Inc. (Booth 807) Consultants.

Royal Cotton Mill Company (Booth 60) Knitting yarns. Complete display of combed cotton knitting yarns and blend yarns. Joint exhibitors with Sellers Dyeing Company.

Saco-Lowell Textile Machinery Division (Booth 78) Dyeing and finishing as well as spinning equipment. On display will be the Saco-Lowell Model SJ-4C worsted spinning frame and the Saco-Lowell Fleissner dryer. The frame offers maximum flexibility of adjustment for worsted, synthetics and blends in 1½ to 8½ inch staple lengths. Simplicity of adjustment, with single or two-zone double apron drafting is a feature of the spinning unit. It has completely anti-friction bearings and all gears are interchangeable.

The dryer is designed for drying tubular knit goods, all types of raw stock and loose fibers, top, tow, skeins and nonwoven fabrics. The model will demonstrate tensionless drying of knit goods for maximum efficiency.

Personnel in attendance: J. W. Hubbard, W. F. Lowell, Jr., G. F. Wilcox, B. H. Kennedy,

(*Continued on Page* 73)

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in outerwear and underwear

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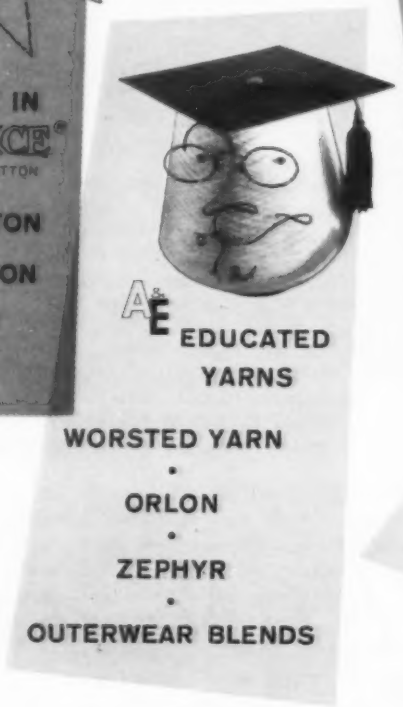

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E. T. Gansler, B. J. Zalkind, A. K. Bonge, A. L. Park, E. L. Thomason and H. O. Whitten.

Sanitized Sales Company of America, Inc. (Booth 835) Textile chemicals. The company's line of Sanitized, purifying and bacteriostatic finishes will be shown. Personnel in attendance: M. Ressner, B. Nusbaum, L. Kahn, Mrs. B. Hilton, Miss J. Sands, Miss J. Valente and Mrs. R. Humphreys.

Scholler Brothers, Inc. (Booth 701) Textile chemicals. The company will feature the Dura Beau, Schollerized, Lanolized and the Hysorb finishes for full-fashioned, seamless and stretch hosiery. Also finishes for knitted, woven and wash and wear fabrics.

Personnel in attendance: E. S. Atkinson, L. M. Boyd, E. J. Fitzgerald, Jr., A. T. Glenn, Wm. Jackson, Jr., Robert Martin, A. Harold Miller, D. E. Robertson, J. O. Sweitzer, C. H. Schuettler, W. R. Sargent, W. S. Truette.

Schwabe, Inc., Herman (Booth 1030) Cutting equipment. The company's Dytraulic die cutting machine suitable for knit goods will be demonstrated. The machine is specially designed for knitwear. The machine can be operated in a sideway position so that large sections of material can be moved into the machine from the side opposite the operator.

Personnel in attendance: Herman Schwabe, Edgar Haas and Jack Weil.

Scott & Williams, Inc. (Booth 561) Knitting machinery.

Sellers Dyeing Company (Booth 60) Dyers. Joint display with Royal Cotton Mills.

Scovill Mfg. Co. (Booth 412).

Seamless Knitting Machinery Corp. (Booth 801).

Servo-Stop (Booth 961) Knitting machinery. Display will consist of single carriage high and low butt machine; a tandem carriage V-bed flat machine and three border machines. The latter group consists of a jacquard intarsia and plain machine.

Personnel in attendance: Robert Steiger and Peter Fleischhacker.

Sheil Oil Company (Booth 18) Lubricants. The following products will be featured: Shell Vexilla Oil 117 for full-fashioned hosiery; Shell Needle Oil 23 heavier viscosity for better seamless hosiery; Shell Vexilla Oil 133 for full-fashioned and seamless machines; and Shell special nylon yarn oil for full-fashioned and seamless knitting.

Personnel in attendance: R. M. Cokinda and Ed Colerick.

Singer-Fidelity, Inc. (Booth 461) Knitting machinery. Personnel in attendance: Lawrence Katz, Edmund L. Lauber, Robert Peel, Peter A. Mahler.

Singer Sewing Machine Co. (Booth 455) Sewing machines. Highlight of the Singer exhibit will be the recently developed short-arm 251-21 high speed lockstitcher, equipped with Clinton Trim-O-Matic and mounted on the new Singer Space-Saver unit. Automatically lubricated, the 251-21 cobines the compactness and handling ease of a short arm machine with all the outstanding mechanical features of other models in the famous 251 class. The 251-21 is especially recommended for high-speed production of articles more conveniently stitched on short arm machines: sweaters, knit vests, sportswear, blouses, underwear and a variety of women's and children's wear.

A major work aid in the sewing room, the Trim-O-Matic automatically performs two important operations: (1) positions the machine needle either in or out of the material, as required, whenever the operator stops the machine; (2) trims both needle and bobbin threads.

Exhibited for the first time, the new Space-Saver unit is a pedestal type table and stand which facilitates more efficient arrangement of sewing machines and allied equipment as well as more economical use of floor space. The specially shaped table (top surface and all edges bonded with Formica) is supported by a heavy gauge steel stand having all four legs located to the right of the treadle. Steel anchors, locked in the wood core of the table, eliminate through-the-table fastening devices which could mar the work surface or snag material.

Singer will also exhibit the following machines and equipment: 240W12 with Clinton Cyclomatic—featuring fully automatic lubrication, finger-tip

(*Continued on Page* 75)

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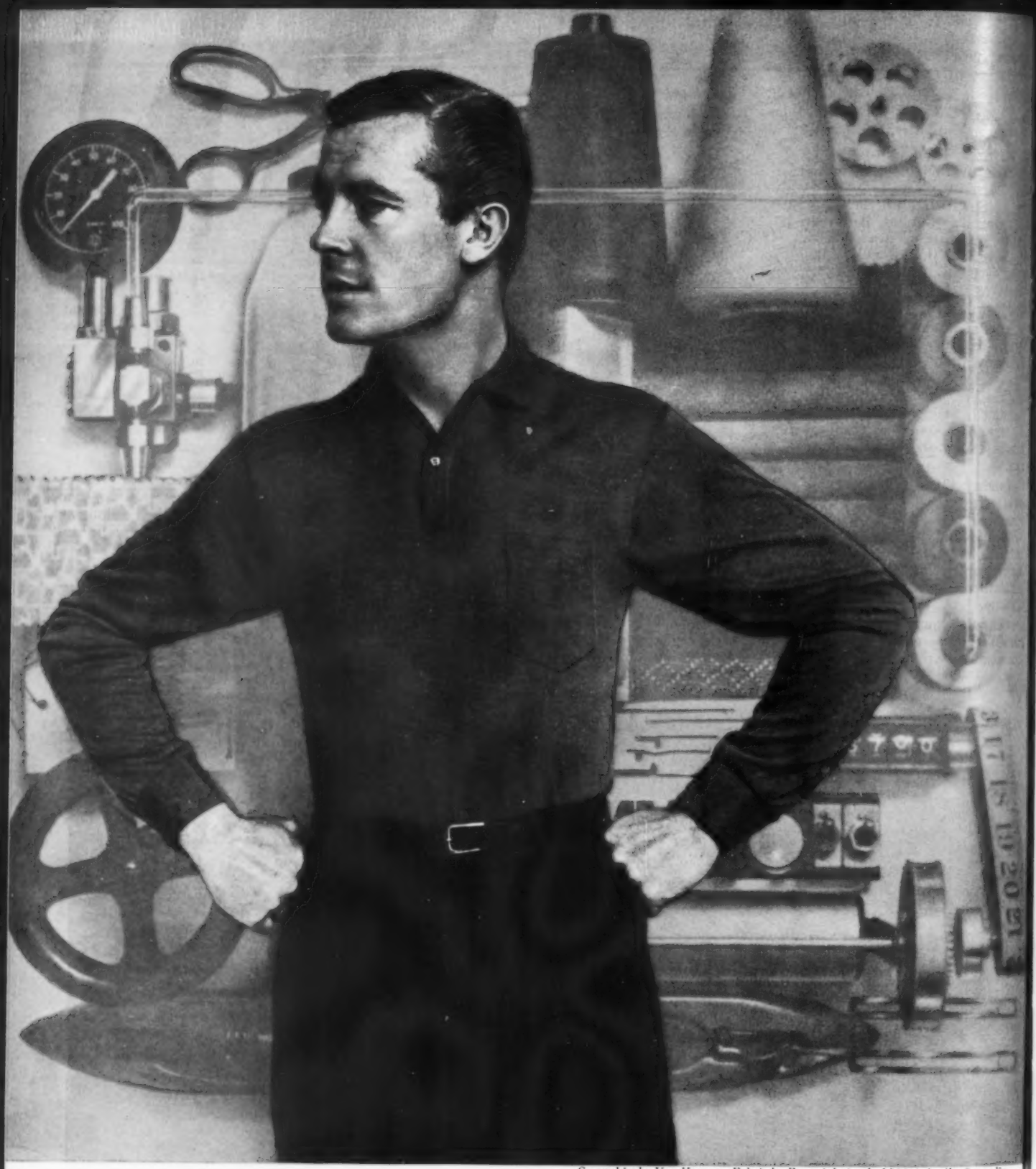

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machine adjustments, simplified threading and precision thread control, the new 240W12 single thread chain stitcher is ideal for high speed attaching of labels to knitwear products. The Clinton Cyclomatic, automatic needle positioner, automatically positions the sewing machine needle either in or out of the work piece as required for various sewing operations.

251-12 with Clinton chain cutter and flip stacker, a new high speed lock stitcher with full-cycle automatic lubrication and many other engineering advances, the 251-12 incorporates a pendant link feed mechanism designed for more desirable feed motion with resutlant smoother, flatter seams. The Clinton chain cutter and flip stacker provide a completely automatic work disposal system that substantially reduces work handling time.

Personnel in attendance: J. E. Wertz, P. R. Mohney, J. J. Santella, G. C. Dickson, A. Shenusky, J. Rockerath, W. O'Connell and Miss E. Bobonis and Miss A. Millington.

Smith Products, Inc. (Booth 1047).

Soabar Company (Booth 104) Labeling machinery. On display will be the new Soaseal ticketing machine claimed to be a new concept in marking and attaching various sizes of non-transferable tickets to delicate fabrics and try-on merchandise. Also, the Quick-Stick labeling machine. This unit marks and applies various sizes of pressure sensitive labels to filmed packages or boxes.

Personnel in attendance: C. B. Hutchinson, S. N. White, James Meehan, Tracy B. Clute, Oscar Turran, Bert S. Gowdy, William A. Roberts.

Sonoco Products Company (Booth 209) Cones, tubes, cores, spools, bobbins and other paper specialties.

Personnel in attendance: H. M. Adams, C. L. Burnham, O. F. Fayne, W. S. Hawkins, J. J. Hughes, W. R. Peacock, G. K. Lewis, C. W. White, B. H. Biggs, W. J. Durkin, D. R. Godshalk, A. P. Hearon, W. K. Lewis, Jr., J. C. White, J. A. Durkin, C. H. Campbell, J. A. Reagan, Jr.

Southern Textile Machinery Company, Inc. (Booth 53) Loopers. The company will exhibit its pedestal mount Stylemaster looper and conventional Model P looper in addition to the following three pieces of equipment: a Model 6000 inspection machine for ladies' hosiery; a Model 5000 inspection machine for ladies' hosiery; and a 40pt Sotco Model looper for ladies' hosiery.

Personal in attendance: T. A. Paxton, president; Russell Shelton, Aubrey George, Billy Bryan.

Speizman Co., Inc., Morris (Booths 161 and 168) Knitting machinery. Exhibit will consist of the latest model Terrot high-speed, double knit jersey machines, both in plain jacquard and four-color striper models. Included will be the new 30-inch diameter, 36 feed high speed unit which will be shown for the first time to the trade.

The new Domisse fabric finishing machine will also be shown for the first time. The company's hosiery machines manufacturing division will show the new Carolina two feed Model K2FS machine equipped with individual motor drive, suction take down attachment, in a completely re-designed form.

Personnel in attendance: Morris Speizman, Ted Valenstein, Larry Speizman, John H. Barnes, David A. Kast, G. E. Hart.

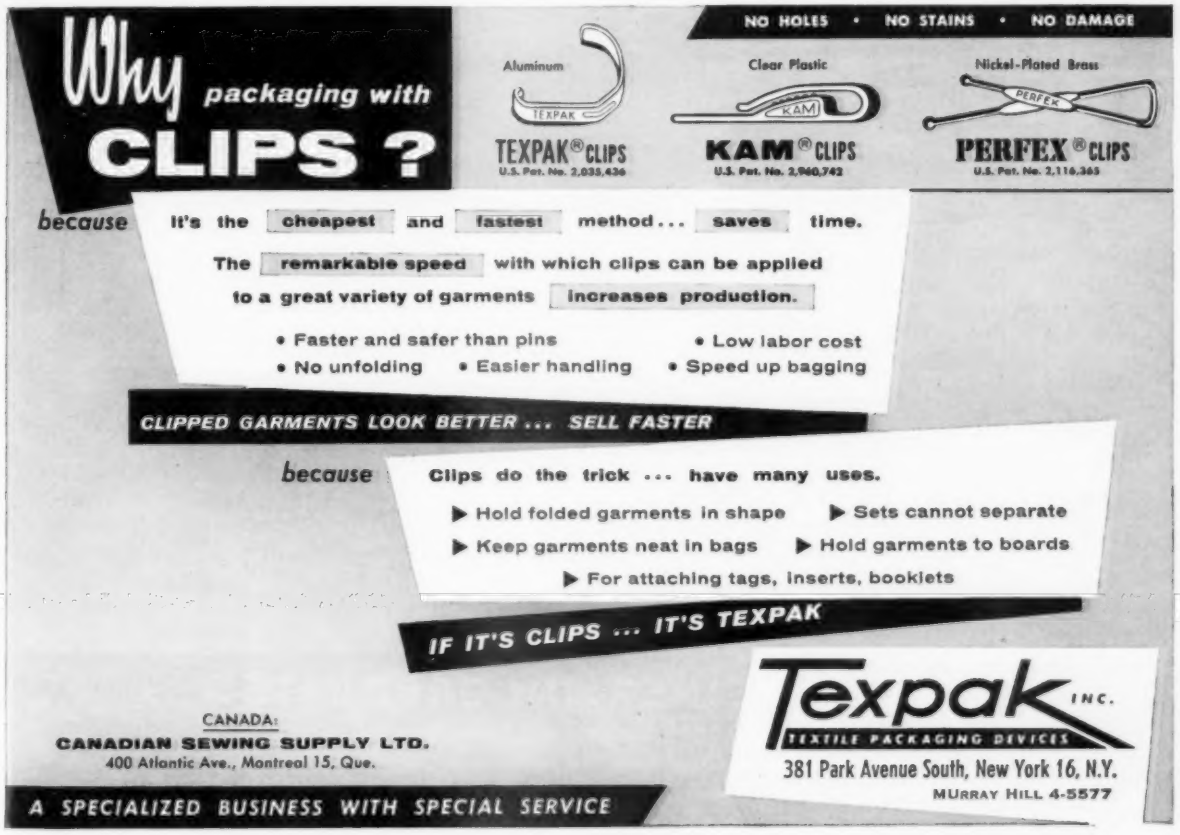
Standard - Coosa - Thatcher Company (Booth 541) Knitting yarns. Items on exhibit will be high grade mercerized cotton yarns and cotton industrial sewing threads. Some of the brands which will be on exhibit are Durene yarns, Preemo yarns and S. C. T. sewing threads.

Personnel in attendance: D. Brooks Barlow, Tomas Besosa, Wm. C. Bouton, James H. Clarke, Charles H. Eager, Joseph O. Foil, Freeman R. Harris, Don Jensen, Muir Lyon, Robert G. Miller, Joseph A. Patrick, R. Dan Pullen, James Schenck, James M. Smith, Robert C. Swan, J. Michael Thatcher, Jr., W. Lane Verlenden.

Standard Financial Corporation (Booth 24).

Steel Canvas Basket Co., Inc. (Booth 367) Materials handling. Display will consist of canvas baskets, canvas trucks, canvas hampers and canvas bags. Albert E. Pratley will be in attendance.

(*Continued on Page* 77)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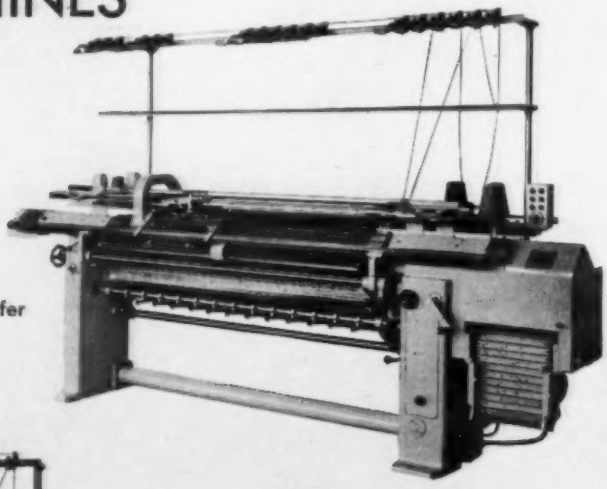
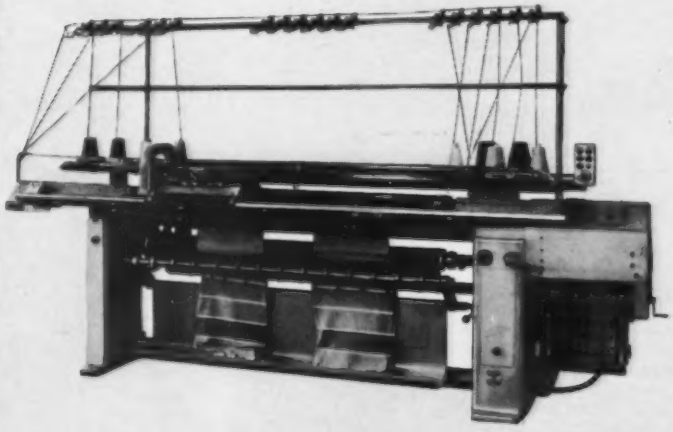


Model DJFU

Jacquard & Automatic Stitch Transfer



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Stevens & Co., Inc., J. P. (Booth 815) Knitting yarns. Reception Booth. Personnel in attendance: Hoyt Bailey, Warren Bethel, L. H. Buchanan, Louis Cramer, Joe Christian, Joe Durrell, Dave Fox, Ira Garrett, Dick Johnson, Dan Libby, Bob Mathieu, Dave Morgan, Joe Rhame, Wallace M. Sutton, Harry Yarborough.

Stonehill Knitting Machines Corp. (Booth 725) Knitting machinery. The company will introduce the new Universal Supramat Model B in addition to the Supramat Model A machine. The former is a more advanced model, possessing a double lock cam system. In addition to these V-bed flat machines, Stonehill will demonstrate the Morat Model SEUMA, a circular jersey yardgoods machine for the production of double jersey fabrics in plain and a wide range of jacquard patterns and the Morat Model FKT, a sweater-strip machine, producing continuous garment lengths in jacquard, relief and cardigan stitches with attached 1 x 1 rib trim, tubular welt and separation between garment strips.

Stop-Motion Devices Corp. (Booth 761) Stop motions. Products on display will consist of various makes of knitting machines in operation, equipped with Wesco electric stop motions; sewing machines in operation equipped with Wesco electric stops; Wesco two-stage electric yarn finishing device; Wesco tensolators both spring and balanced types; foam rubber seats for cones; spring and weighted tension assemblies; spring type cone holders; hole and press-off detectors; Guardian rib hole detectors; and rotary fabric lights.

Personnel in attendance: N. J. Tellerman, Gordon F. Connors, Vincent G. Chaplin, Robert Handelsman, Edward Vossen, Ferd. Wachsman.

Street Company, John F. (Booth 818) Knitting yarns. Display will consist of cotton, worsted, wool spun synthetic yarns made by Roxboro Cotton Mills, Kent Manufacturing Company and Globe Mills Company.

Personnel in attendance: E. F. Sherman, H. A. Street, Jr., H. B. Billian, J. K. Gillespie, W. C. Schmidt, G. M. Georgles, J. A. McDonald, H. G. Johnson, W. L. Nicholson, E. Smith, J. A. Long, Jr., W. L. Harris, L. Morrell, P. S. Smith, W. I. Kent, W. T. Kent and G. Macourt.

Supreme Knitting Machine Co., Inc. (Booth 125) Knitting equipment. A wide range of circular machines for the production of outerwear and underwear fabrics will be shown in addition to fancy twisted yarns produced by the company's subsidiary Supreme Novelty Yarns, Inc.

Personnel in attendance: Lester Mishcon, Sidney Mishcon, Bernard Narker, Irving Golden, Jack Radin, Joseph Teitelbaum, Sidney Bienenfeld, Felix Sternson.

Talcott, Inc., James (Booth 833) Factors.

Templon Spinning Mills (Booth 136) Knitting yarns. Spun synthetics and fine worsted and novelty yarns will be shown. Joint display with Eastern Yarn Mills and Chemspun Yarns, Ltd.

Textiles, Inc. (Booth 828) Knitting yarns.

Textile Machine Works (Booth 401) Knitting machinery. New seamless and circular knitting machines will be displayed in addition to samples of outerwear produced on the company's full-fashioned outerwear machines. Latch and spring beard needles and other wire products manufactured by the company will also be on exhibit.

Personnel in attendance: L. R. Thun, E. P. Master, H. G. Fiedler, R. J. Ryan, L. T. Yeager, R. W. Weaver, L. P. Garrigan, C. R. Erb, B. F. Coile, M. A. Coudeu, E. P. Frank, H. R. Haak, D. J. Hehr, D. L. Heydt, F. L. Hughes, P. A. Jacquard, R. Janda, H. Kretz, C. R. Moyer, D. A. McDonnell, G. McKenzie, E. Paige, H. Printz, E. A. Shoemaker, H. Siegel, H. R. Wade and K. Williams.

Textured Yarn Company, Inc. (Booth 1007) Knitting yarns. Reception booth. Personnel in attendance: Ira Schwartz, Irving Schwartz, Robert K. Stanley, Fred Marcus, Alan Milman, Stanton A. Freedman and Scott Alexander.

Threads, Inc. (Booth 935) Sewing threads.

Tompkins Bros. Co., Inc. (Booth 10) Knitting machinery. The company will demonstrate

(*Continued on Page 79*)

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its new 54-inch circular spring needle carpet knitting machine.

Torrington Company (Booth 437) Knitting needles. Display will consist of the new advances in design, manufacture and packaging of Torrington knitting machine and sewing machine needles. These include ladies' seamless hosiery needles with a solid shoulder; complete line of leaded units for tricot and Raschel machines; new round point and thin ball point sewing machine needles to prevent needle cuts and holes when stitching knit fabrics; angular pressed rivet latch knitting machine needles for rugged applications using medium to fine gauge needles; Kooltorr Finish for sewing machine needles to overcome needle heat; knitting machine needles with Lustorr Finish, which produces a cooler running, less yarn snagging and fabric rejects; heavy duty hard chrome plate on needles used in power net Raschel machines.

Personnel in attendance: R. T. Dunlap, E. B. Thompson, W. R. Reid, Jr., C. H. Rowe, C. R. Johnson, L. W. Losee, E. F. Didier, L. P. Burghoff, R. Shepard, A. V. Maurer, F. A. Howard, Jr., D. A. Burghoff, S. J. Neag, H. S. Gordon, H. E. Harris, G. T. Stanley, C. T. Spalding, W. Myers, R. L. Brace, J. J. McCaffrey, L. T. Mettling, A. H. Way, E. P. Schwarze, J. W. Beaber, W. A. Patz, H. E. Gosling, Jr., P. S. Warner, G. B. Walls, N. K. Ingraham, Jr.

Also Alexander Frigyes, H. M. Deming, R. E. Jess, L. R. Whitcomb, J. L. Cook, D. Traymor, L. J. Gould.

Tricoma, Inc. (Booths 655 and 255) Knitting machinery.

Tubular Textile Machinery Corp. (Booth 101) Finishing machinery. Exhibit will show the complete line of Tube-Tex equipment for the processing and finishing of circular knit fabrics. Featured will be Tube-Tex Reelax-Jet dryer, Tensionless calender, Matching Machine and Extractor Pad. Special emphasis in the display will be placed on the new Tube-Tex Tri-Pad and Tube-Tex Open Width Finishing Machine.

Personnel in attendance: Eugene Cohn, Don Foreman, Lee Rothenberg, Jr., Gene LoBell, Edward Goodman, Frank Allshouse, Eugene Weeden, Matew Barbiasz.

Turbo Machine Company (Booth 151) Finishing Machinery. Equipment on display will include Electro Finisher Machine, Spreader Steamer Machine, Padder-Extractor Machine, Automatic Framing Machine, Automatic Festooning Machine, Dye Boarder DB 120 and 50 Lb. Rotary Dyeing/Washing Machine 12 RD-60.

Turbo's new Electro Finisher, utilizing an aluminum cylinder, incorporates many newly conceived design features. A three-roll cradle permits a 140 deg. F. wrap around of the material while processing. A reduction in weight and an attractive appearance are a few of its additional features. Its lower price should elicit the interest and attention of all high pile processors.

The new Automatic Framing Machine is for framing high-pile fabrics. It is designed automatically to fasten fabric to disposable frames used in conjunction with protective packaging for shipping.

The Turbo Automatic Festooning Machine eliminates costly and time consuming hand operations in festooning high-pile fabrics. Machine drapes the fabric vertically within a portable rack, thus adding protection and speed to handling operations.

Personnel in attendance: L. Schierenbeck, C. D. Schierenbeck, E. J. Berger, R. G. Myers, W. K. Wyatt, John Stafford, Edward Hughes, DeHaven Butterworth, William Schwarze, John Emlikian, Francis Dougherty, Alex Pegon, Frank Yale, John Longaker.

Twistex Company, Inc. (Booth 1008) Throwsters.

Twitchell, Inc., E. W. (Booth 140) Packaging materials.

Union Carbide Chemicals Company (Booth 719) Synthetic fibers. The expanding use of Dynel modacrylic fiber in the knit goods industry will be highlighted in the company's display. The Dynel exhibit will accent significant contributions of the fiber in knitted fabrics, as well as current developments for new knitting applications of Dynel. Feature of the display will be a complete collection of the latest knitted pile coating fabrics including novel printed

(*Continued on Page* 85)

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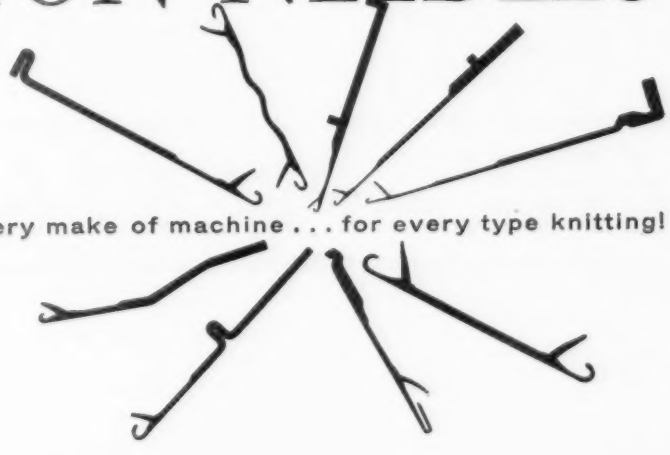

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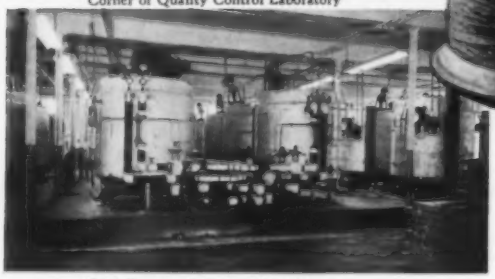

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The bare rubber thread used in your product is probably one of its smallest cost factors; yet it is without question, one of the most important materials used.

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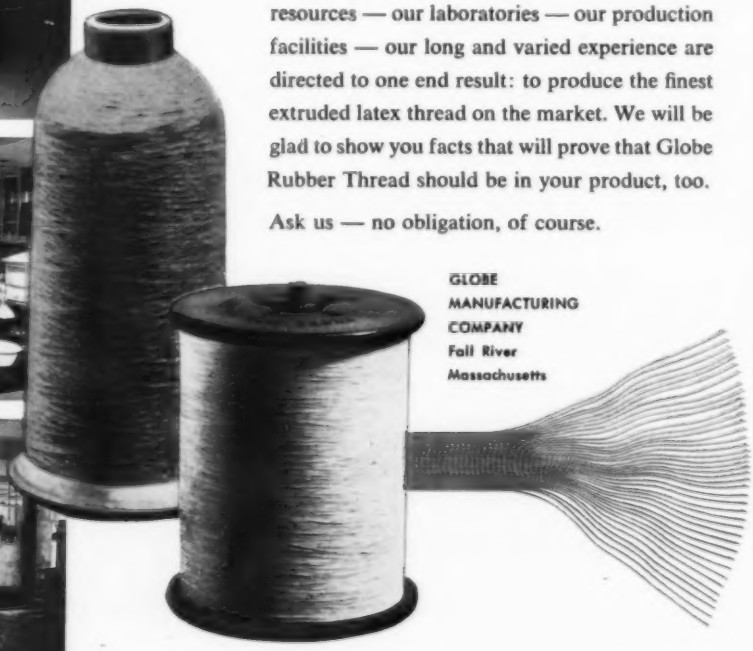
Ask us — no obligation, of course.



GLOBE MANUFACTURING COMPANY
Fall River
Massachusetts

fabrics that resemble various animal furs.

Also to be shown are sliver knit Dynel pile lining fabrics, including the new two-height piles with fibers simulating guard hair, and the new shearling effects.

A full range of sliver knit pile scatter rugs of Dynel and Dynel blends are also to be exhibited.

Men's and women's underwear of Dynel in Raschel and circular knit constructions will be shown as well as the new thermal knits and underwear product developments in new whitened Dynel fiber.

Other new developments which will be on exhibit include: a sweater of Dynel, wool and mohair blend; and a demonstration of heat shaped knitted constructions of Dynel for various apparel and other applications.

Personnel in attendance: John S. McGilly, A. L. Snyder, C. A. Strodil, V. J. Kremers, T. P. Mulligan, W. T. Burgin, R. S. Brissette, P. G. Rotko, T. A. Feild, Jr. and B. Michalko.

Union Special Machine Company (Booth 425) Sewing machinery. Union Special will exhibit a total of 25 machines. Many different styles in Class 39500 overedging machines will be shown including three styles for toe seaming womens' seamless hosiery and men's socks according to the GeTaZ and Ledwell methods. Other machines to be exhibited include Class 52300 four-thread Safety-Stitch machine for simultaneous seaming, trimming and overedging; Class 52700 for attaching elastic; Class 53100 high speed, bobbinless zig-zag stitch machines; Class 53400 and Class 54400 machines.

Still other machines to be shown by Union Special include Class 61400 and Class 61900 lockstitch machines. The Lewis machines that will be exhibited are Class 150 chainstitch machines for blindstitching; Class 200 button sewers; Class 160 blindstitch tacking machines; and the Columbia label sewer.

Personnel in attendance: M. O. Moulton, L. M. Brown, A. J. Feigel, J. R. Haderly, R. J. Williams, M. F. Groover, K. Heitkotter, H. P. Johnson, B. W. Merz, C. R. Batchelor, C. L. Rosenquist, J. R. LeTourneur, D. C. Jenkins, W. E. Palm, Ben Zahler, D. M. Bender, L. D. Cassell, R. B. Foster, C. D. Mairs, H. T. Powell, R. L. Smith, W. D. Speer, T. J. Traylor, R. S. Vogt, E. Detweiler, F. Neff and W. D. Harrod.

United Elastic Corporation (Booth 341) Elastic fabrics. Display will consist of elastic webbing, braid and cord of all types for underwear, hosiery, stretch tights, foundation garments, swimwear, outerwear and sportswear (including dry-cleanable elastic webbing); elastic and non-elastic webbing for athletic and surgical items; power net for foundation garments; Raschel knit fabric for underwear and many other uses, for cold weather conditions; and Anchorlastic and Anchortex for trousers and skirts.

Personnel in attendance: R. A. Waite, P. M. McIntosh, S. C. Lilley, Walter E. Dalby, E. E. Cadwell, E. R. Boehm, G. B. Weidhaas, D. B. Cameron, F. L. Dorr, C. J. Winkler, H. O. Hollingworth, Hugh White, Malcolm Fillmore, John K. DeBold, Sidney W. Tingen.

United States Leasing Corporation (Booth 904) Financing.

U.S. Blind Stitch Machine Corp. (Booth 2) Sewing machinery.

U.S. Rubber Company (Booth 528) Rubber yarns and spun knitting yarns. Products from the company's Lastex division will be Lastex and Laton elastic yarns; Vyrene spandex fiber; Lactron extruded rubber thread; Revere rubber thread and tape; and Vyrene spandex fiber—extruded monofilament elastomer used as core in new Lastex yarn.

Products from the company's knitting yarn division will be singles combed and carded cotton yarn; Orlon acrylic staple spun and Turbo yarns; Acrilan acrylic natural and heathers yarns; natural and synthetic blend yarns.

Personnel in attendance: J. L. Allen, M. E. Bliss, L. M. Boulware, W. J. Connelly, H. E. Cooper, A. R. Engel, W. F. Giddings, B. E. Kelton, P. J. Regan, H. A. Young, R. A. All, T. S. Byrne, R. P. Clark, S. K. George III, R. R. Hampton, V. C. McQuiddy, Jr., A. E.

(*Continued on Page* 89)

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O'Heir, F. C. Phillips, G. W. Wright, W. L. Wylie.

Utica Novelty & Mill Specialty Co. (Booth 146) Cutting room equipment. Machinery on display will consist of Utica combination cutting and winding machine with a new variable speed drive attachment; Utica automatic double cuff cutting and turning machine; Utica collarette cutting and winding machine; and Utica hand laying up machine.

Personnel in attendance: Joseph A. Firsching, Jr., Donald Firsching, Joseph A. Firsching, 3rd.

Venango Engineering Co., Inc. (Booth 565) Dyeing equipment. Display will consist of a 25-pound capacity newly designed Venango combination washing and dyeing machine. This machine is an entirely new concept of wet processing and is furnished complete with a variable speed drive and an adjustable reversing timer.

In addition, package dyeing equipment for both standard and high temperature operation will be shown. Also included in the display will be a new design cabinet type Venango control panel, complete with a cyclelog temperature controller.

Personnel in attendance: William Stegers and William A. Fuchswanz.

Waterman, Merrill, Largen & Co., Inc. (Booth 529) Knitting yarns.

Whitin Machine Works (Booth 1005) Textile processing machinery. A new machine for the processing of stabilized textured yarns built by Ateliers Roannais de Constructions Textiles (ARCT) Roanne, France, will be shown. Called the Type FTF machine (false twist-fixed), it was introduced on the Continent in 1960.

Personnel in attendance: Robert F. Waters, J. Hugh Bolton, J. H. Bolton, Jr., R. I. Dalton, Jr., W. A. Newell, C. R. Brussee, G. F. McRoberts, Henry Crouzet and Rene Lauer.

Willcox & Gibbs Sewing Machine Company (Booth 549) Sewing machinery. The machines to be shown in operation include: 813-C-17 Superlock Single needle three-thread overedge machine for toe seaming on

(*Continued on Page* 91)

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Quality
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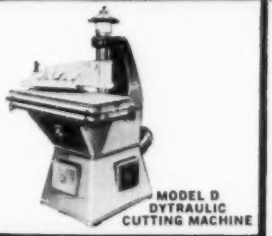

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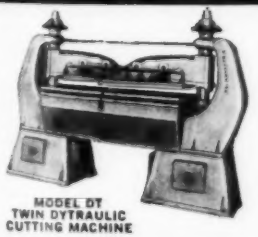

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New Orleans . . . Ira M. Kohn, 8 Trianon Plaza
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Portland, Ore. . John S. James & Son, Sherlock Bldg.
St. Louis . . . Hayne-Surridge Co., 1901 Pine St.
St. Paul . . . . Norman Nelson, 596 Endicott Bldg.
Toronto . . N. W. Scott & Co., Rm. 209, 23 Scott St.

VISIT US at the Knitting Arts Exhibition, Booth 341, Atlantic City Convention Hall, April 24-28

men's and boys' socks; 813-C-2-1 Superlock single needle three-thread overedge machine for closing elastic banded garments; 813-J-15-1-Z-3 Superlock single needle three-thread overedge machine for attaching lace edging and trimming fabric in one operation, eliminating the need for seam opening.

Also, 1422-CK-13-2 serge and seam double needle four-thread overedge machine with a true serging stitch and an independent reinforcing two-thread chain seaming stitch; 1311-1 flatlock machine with U.S. 605 stitch type plus a new trimming mechanism that trims positively on all weights of fabric and elastic; 1602-CWS transverse looper double needle three-thread machine will be organized for attaching waist elastic to nylon tricot.

Other machines include the 1001 Rotalock is a single needle lockstitch machine; Pfaff 238-277 single needle zig-zag machine with transverse rotary hook, needle position adjustment and stitch width locking device; Pfaff 433-6 high-speed single needle lockstitch machine with link take-up will be fitted with a Sewmatic top feed mechanism that assures accurate feeding on slippery materials; Pfaff 3334-30 and -220 bar tack lockstitch machines.

Personnel in attendance: Irving Steinbach, Norman Wonnacott, Arthur Miller, Thomas N. Roboz, Charles H. Haviland, Abraham Rashbaum, Lea Morea, Marie Catanzaro, James Farrell, Lawrence Connolly, Kenneth Arutt, Lawrence Besthoff, Richard Russell, Dominic Asaro, James Fiola, Frank D'Olonzo, Gunter Ditrich, Phil Malberti and Stan Waitzman.

Wildman Jacquard Company (Booths 147 and 148) Knitting machinery. The display will consist of the following machines: The new PBP-44 Challenger machine, double jersey circular knitting machine with a revolving cylinder and dial; the JSD-24 knitting machines which are new to the Wildman Jacquard line of circular knitting machines and which will be operating on a 14-cut, set up for dress and skirt fabrics; the 30-inch TJI-12 circular jacquard transfer (rib) machine, which will be set up for a 14¼ cut for skirt and

(*Continued on Page* 93)

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- MEASURING
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Manufacturers of all types of finishing machines, high speed cloth turning machines, calendars and Aero Dyne Dryers.
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Now in full operation! The newest, most modern knitting yarn plant in the United States producing and shipping the finest yarns daily to the country's leading sweater and sportswear manufacturers. And, they keep re-ordering case after Federal Case.

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*DuPont's trade-mark for its acrylic fiber

sweater fabrics; the 23-inch FBW-6 high-pile knitting machine, set up for three-color high-pile liner material; the 22-inch PB-2 rib trims knitting machine; the TFS-21 Ga. (single section flat machine) set up for full-fashioned sweater bodies; the 400 needle seamless hosiery machines with the new Wildman Jacquard Tru-Tex attachments; a new half-hose machine; and the 30-inch LHDS-6 circular Jacquard links and links (purl) knitting machine, six cut set for semi-bulky sweater fabrics.

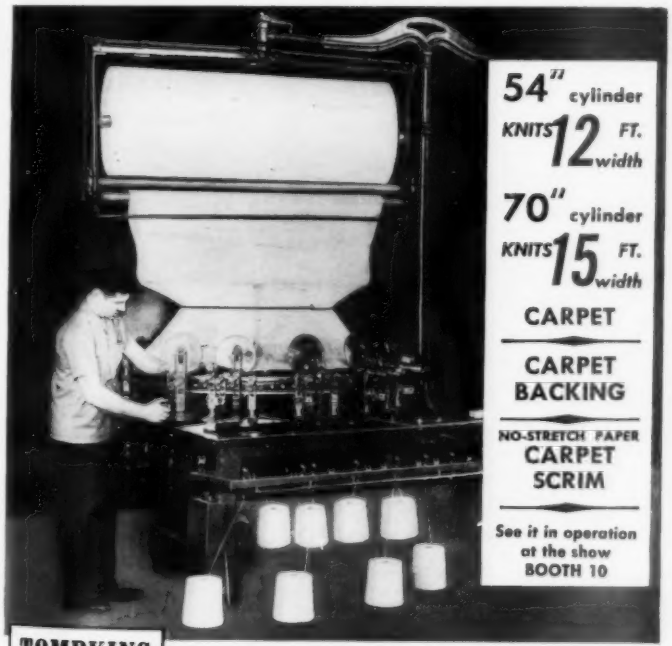
The Model PBP-44 Challenger is a 30-inch diameter, 44-feed, high production plain yardgoods, double jersey circular knitting machine with a revolving cylinder and dial. The machine is produced in cuts up to 20 x 20 needles per inch. The machine is equipped with long and short needles in both the cylinder and dial. The dial cam sections are made interchangeable and by rearrangement of the needles and/or dial cam sections. It produces the following fabrics: double pique, Swiss or French knit; single pique; eight-lock; full rib; multi-color checks or block plaids; various tuck effects; double jersey; French welt fabrics; and stripes.

At 20 r.p.m. the machine is capable of producing approximately 20 pounds of double pique fabric an hour. Each machine is equipped with an improved compact self-contained furnishing wheel unit which provides an effective means of controlling the yarn feeding to the needles.

This newly designed machine has a rugged modern styled frame and an entirely new heavy dial support stem which provides the necessary rigidity for good knitting and for accurate registration of the dial, both vertically and radially. As a means of increasing the stitch accuracy of the machine a new type dial cap support has been included which firmly holds the dial cap in the correct knitting position and provides a convenient means for making micrometer adjustments to the dial cap setting.

The dial sections are easily interchanged when converting from double pique to interlock

(*Continued on Page* 95)



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Now you can produce 12 or 15-ft. wide carpet and carpet backing — including paper scrim — *faster, at lower cost* with a 54" or 70" TOMPKINS D-1. Both models use standard Tompkins parts *plus* the big quality and economy bonus of the time-proven Tompkins knitting principle. *Write for full details . . .*
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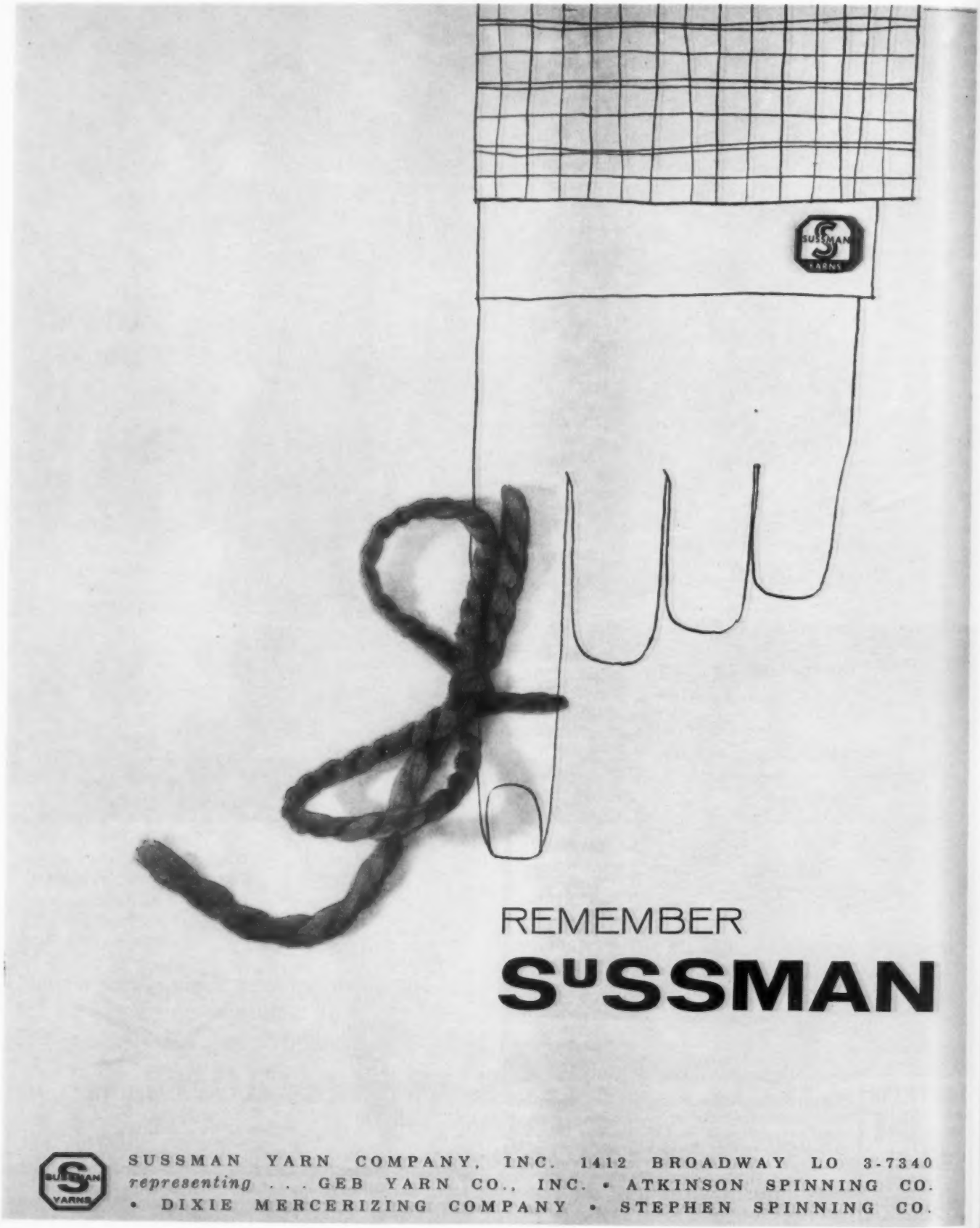
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fabric. Single pique can be produced by resetting the dial swing cams.

An electronically controlled vertical motor drive unit supplies a smooth steady driving force to the machine. The drive side has its own oil reservoir and an automatic oil pump which circulates the oil through the entire drive side assuring quiet, long-life operation. There are four conveniently placed start-stop-jog switches for positive machine control.

All the regular features of the LH-6 machine have been retained in this revised and improved model, including three-color yarn changers independently controlled at each of the six feeds, automatically adjusted stitch cams for both cylinders at each feed, an automatic card control automat which provides for automatic changes from separating course to French welt edge to 1 x 1, 2 x 2 and tubular cuff to body fabrics as required. An automatic oiling system and two-speed vertical motor drive with jogging features are also provided. The new 30-inch diameter LHDS-6 is capable of producing a much wider variety of fancy stitch fabrics than ever before and the machines are available in cuts from three to 12¾ needles per inch.

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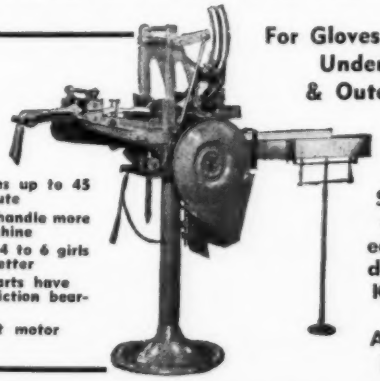

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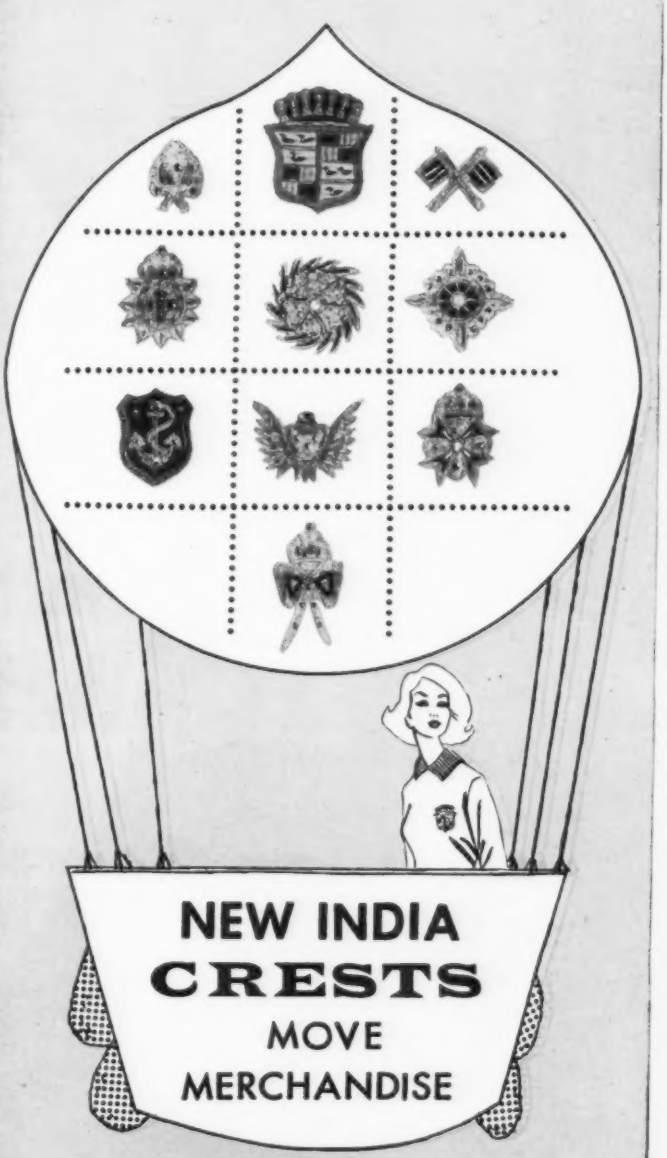

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Knitting Principles

Pattern Notations For Weft Knitted Fabric—R.G.T. Method

By ATTILO TREMELLONI
Professor of Knitting
Technical Institute for Knitting and Weaving of Novara

GIVEN the situation in the knitting industry today and its continual improvement in technique, the development of a uniform system of graphic notation which will ensure understanding in all the countries concerned has become of considerable importance. It is a fact that it is difficult to interpret Italian and foreign definitions and notations for weft knitted fabric both because of the lack of specialized technical dictionaries and the difficulty of finding precisely the right definition of the terminology in the various languages.

With the introduction of new knitting machines, the necessity for this common technical language is felt more and more acutely. This graphic representation is the only solution which can eliminate this fundamental looseness of definition and consequent difficulty in understanding the terminology, given an unmistakable concept of any required knitting pattern.

As far as weaving is concerned, the problem has been solved many years ago. The use of notation on graph-paper has been universally adopted and technicans in all countries are able to interpret it perfectly.

In the knitting industry, however, the question is much more complex since there are two completely different and distinct knitting structures (weft knitting and warp knitting) and hence two different notation systems are necessary. Moreover, specialists, in the various countries have all so far found it necessary to use their own individual systems of notations in the different graphic signs, thereby creating confusion in terms. The practical aim is to achieve a system capable of representing any knitted structure, however simple or complicated, to any knitting technician and which will guarantee avoidance of misinterpretation in correspondence between machine builders and fabrc manufacturers; between various technical schools; and provide a "graphic esperanto" invaluable for technical literature and international conferences, as a simple medium for exchange of ideas.

COMPOSITION OF THE TEXTILE INTERLACING — It will be helpful to begin by giving some notations concerning textile interlacing structures; that is, the essential differentiation between binding and the working out of the basic web threads obtained by any given interlacing.

Any given web is technologically made up of a lap of the textile materials of indefinite length, limited width and relative thickness which gives an all-over flexibility and firmness, compactness and varied appearance, according to the use to which the material is to be put. Any given web can be obtained by two procedures:

1. Interlacing of threads (cotton, wool, silks, etc.).
2. Adhesion of fibers with felted properties (felts) or with adhesive ingredients.

According to the pattern in which the threads are interlaced, webs can be classified as follows:

1. Simple interlacing webs — those which can be obtained by using binding points formed with parallel threads only, placed at right angles and crossing in opposite directions. Common webs, so-called "flat threads" and "braid fabrics" come under this head.
2. Twist-interlaced webs — those in which the cross binding points are formed by simple, parallel threads, fixed by "wrapping" twist threads. Gauze and tulle belong to this category.
3. Knot-interlaced webs — those in which the cross binding points are formed by various knots, using one or two series of threads. Such webs are called "nets."
4. Curvilineal-interlaced webs — those in which the cross binding points are formed by sinuous intersection in horizontal and vertical position using only one series of threads. These webs are called "knitted fabrics" which may be of horizontal structure, called "weft knitted" or of vertical structure, called "warp knitted."

Interlacings of all kinds are known technically as "weaves"; they generally consist in the smallest ratio (both in width and height) of the interlacing in question and they form the basis of the lay-out for relief or colored jacquard.

FLAT THREAD WEBS — Two elements are required for flat thread webs. The first, the "warp," consisting of a series of flat threads placed longitudinally to the web. The second is the "weft," or interlaced thread, moving horizontally; the warp is at right angles to it.

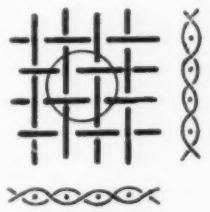

Fig. 1

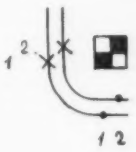

Fig. 2

Fig. 1 shows the threads and weft development in the simplest interlacing pattern known as "web." Every tie is a simple crossing of threads that must be rather thick to prevent the tie from slipping and producing uneveness in the web. Flat thread webs are almost all woven on flat frames: it is only since a few years ago that tubular knitting machines, producing tubular webs, have been introduced.

Fig. 2 shows the universal weaving graph paper for web interlacing in which each square represents a weft thread that passes over a thread or conversely. We find that the flat crossing between a thread and a weft is represented either by a white or black square. The whole graphic representation system for web fabrics is based on this simple principle. We will mention here, briefly, that on the lower side of the diagram is shown the interlacing of every thread in the various heddles (drawing-in) and on the left hand side are marked the successive orders of heddles in the various weft insertions.

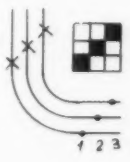

Fig. 3

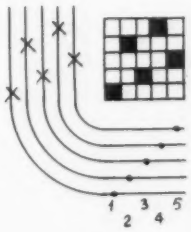

Fig. 4

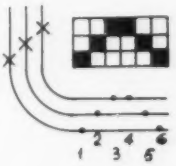

Fig. 5

Fig. 3 shows the graphic representation for fundamental herringbone interlacing.

Fig. 4 shows the graphic representation for principal interlacing.

Fig. 5 shows an interlacing for any "return" to show a system of of drawing-in which gives us control of a number of threads at the same time.

Fundamental Structure Of Knitted Fabrics

A knitted fabric can be made using one simple element: either the weft or the warp element. Obviously, the web characteristics obtained with the two methods differ as do the mechanical means employed in their fabrication. However, the aim to be achieved in these two cases is the interlacing of threads by loops which pass through a second series of loops made previously. This is the reason

(*Continued on Page* 99)

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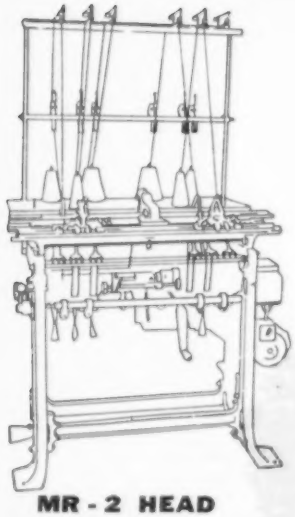

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MRHF - HEAD
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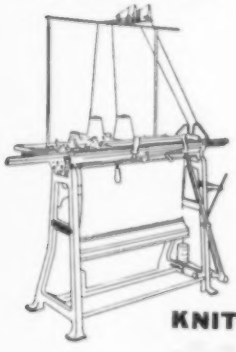

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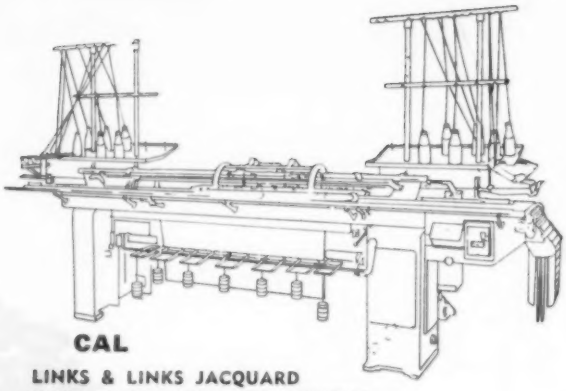

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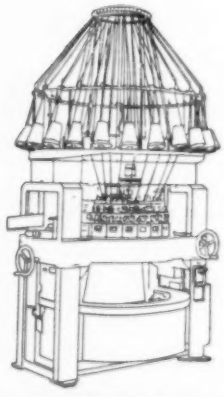

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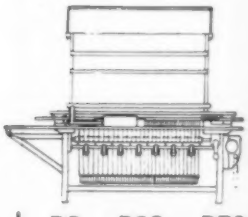

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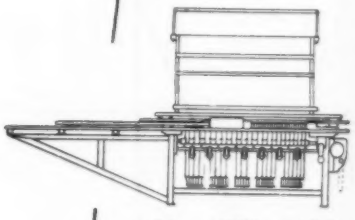

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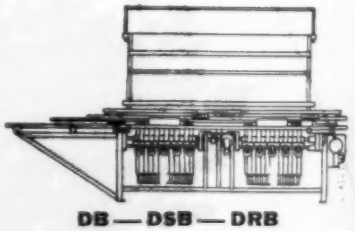

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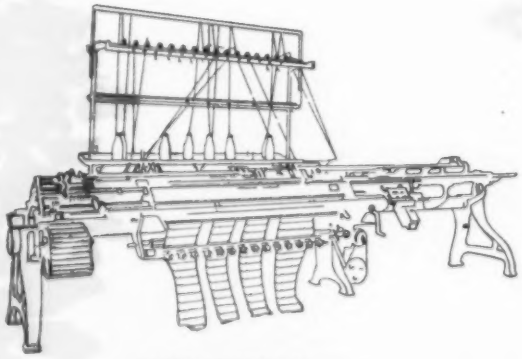

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why these webs come under the general interlacing category of "curvilineal threads." So we can classify knitted fabrics in two principal categories:

1. Weft knitted fabrics
2. Warp knitted fabrics

Knitted weft fabrics are in practice known as "collected loops" because the feeding of a single thread moving horizontally is obtained successively from right to left or conversely; that is, the thread "collected" by degrees from the needles which are working.

Knitted warp fabrics are also known as "lapping loops" because the alimentation of all warp yarns (their number is that of the needles working) is obtained in a single movement; that is, the "lapping" in which the threads on all needles form a complete row of loops.

Setting aside warp knitted fabrics, for which graphic representation is almost universal, we shall now take into consideration the only category of weft knitted fabrics that have so far been developed technically either with adopting interlacing or the successive marking of the "gathering" thread on the needles in each row. In both these cases the time required for "writing up" is disproportionate, which explains why for about thirty years now, knitting technicians have been taking an interest in this problem with relative success. Nonetheless their work has gradually established the basis of a workable, practical method.

Graphic Signs For "Simple Loop"

Fig. 6 shows the "fundamental interlacing structure for weft knitted fabric." The ring is traced to include binding points of a "loop"; that is, the basic element of the knitted fabric where a "horizontal series of loops" produces a row and a "vertical series" a wale.

Fig. 7 shows a fundamental loop structure. The horizontal dotted line divides the loop into top and bottom halves. The lower part is more important as the patterning of its interlacing with other loops determine the structure of a fabric.

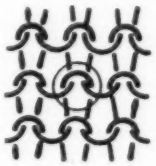

Fig. 6

Fig. 7

Fig. 8 shows how the cross threads form a plain fabric. There are four points of intersection. In weaving this would be represented by four squares. The points of intersection are fixed and because a unit like this represents a complete movement of one needle it is logical to use one symbol for it.

Fig. 9 shows a semi-circle that is a symbolic representation of a plain structure as seen from the back. With this symbol it is possible to form complete structures as will be shown further on.

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Figs. 10 and 11 show how, by pulling the fabric sideways, the loop becomes almost a straight line. This sign is simpler, it has been adopted in preference to the semi-circle which is relatively difficult to draw.

The front (showing "front loop")

Fig. 12 shows the same interlacing as in Fig. 6; that is, the fundamental interlacing structure as seen from the front and hence forming "front loops."

Fig. 13 shows how the loop can be considered as being represented by two S shapes, facing in opposite direction like the crossing; this is because they both depend on a single formative agent—the needle.

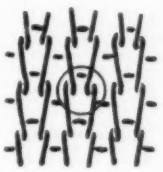

Fig. 12

Fig. 13

Fig. 14 shows the most important part of the front loop—the bottom part where the position of the four intersections are exactly opposite those of the back loop (as seen in Fig. 8).

Fig. 15 shows the symbol V which represents the outline of a loop as seen from the front of the web.

Fig. 16 shows the web pulled vertically forming two lines, the two sides of the V becoming almost parallel straight lines.

Fig. 14

Fig. 15

Fig. 16

Fig. 17

Fig. 17 shows the conventional sign in the form of a vertical stroke, representing a front loop. Like the conventional sign for a back loop, the stroke indicates all four points of the crossing loop bottom.

To sum up, the R.G.T. method is applied in two forms as follows:

1. Theoretical, with semi-circular and V symbols; and
2. Industrial, with conventional signs of horizontal and vertical lines in order to indicate the "back loops" and "front loops" that constitute the fundamental elements of knitted fabrics.

Graphic Representation Of Fundamental Knitted Fabrics

As we have already shown, a simple loop web (technically known as plain web) is obtained by rows and wales of loops, fed by a horizontal thread that is "knitted" from needles. Every needle makes a loop; a horizontal series of needles (called bed) forms a wale of loops.

Fig. 18 shows the symbolic representation of a plain loop web as seen from the back. The numbers, beginning on the lower left side, show the order of rows which the machine bed is forming.

Fig. 19 shows the same structure as represented with symbols. To simplify still further, for wide weaves, horizontal strokes usually written on graph paper can be joined together in one continuous line that shows a row of back loops. The length of the continuous line corresponds to the number of squares, which indicates the number of wales or knitting needles in that particular course.

Plain knitted fabric (back and front loop)

Fig. 20 shows the R.G.T. representation in a plain fabric as seen from the back, with the "continuous" system. The needles, 1, 2, 3, make the "wales" of the web and determine the limits of the black-outlined squared paper. For weaves in which the ratio is small or

(*Continued on Page* 101)

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complicated the dashes are more reliable while for larger designs the continuous system in color gives better results.

Fig. 21 shows the symbolic representation of a plain fabric as seen from the front.

Fig. 22 shows the graphic representation of the same fabric, using the dash method.

Fig. 23 shows the continuous line notation; that is, the same vertical black-lines which form the basis of the 1, 2, and 3 needle wales.

Fig. 18

Fig. 19

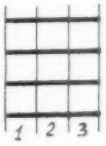

Fig. 20

Fig. 21

Fig. 22

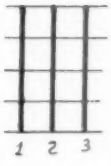

Fig. 23

Rib knitted fabric

So far we have taken into consideration the plain fabric, as seen in Fig. 6 and 12. Plain fabrics are made using a simple series of needles (only one bed). In plain fabrics, seen from the front, the needles are placed in the front of the machine; seen from the back, the bed is at the back (from the observer's point of view). The second fundamental knitted fabric, known as "rib knitted fabric" in which two needlebeds work simultaneously with a "front" and a "back" needle alternately, while the needle facing in the opposite direction moves between the two.

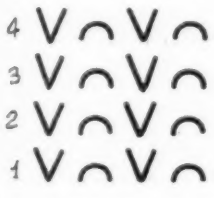

Fig. 24

Fig. 25

Fig. 26

Fig. 24 shows the symbolic representation for rib fabric 1 x 1 (1 x 1 indicates the successive alternation of two needlebeds.

Fig. 25 shows the symbolic dash system.

Fig. 26 shows the symbolic continuous system.

Purl knitted fabric

The third fundamental knitted fabric, is shown as "purl knitted fabric" (links and links). A special (double end needle) works between two beds, placed opposite, making front or back loops in vertical direction. In other words, this double end needle is transferred either from a front or back bed or conversely, making either front loop rows or consecutive back loops.

Fig. 27 shows the symbolic representation of the above.

Fig. 28 shows the symbolic dash system.

Fig. 29 shows the symbolic continuous system where the continuity is only in the back row.

Fig. 27

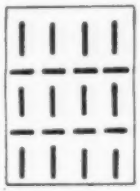

Fig. 28

Fig. 29

Interlock knitted fabric

To sum up, the fourth and last fundamental fabric, known as interlock, is obtained on two beds where the needles "cross" so that if a needle is working, the corresponding one, working in the opposite direction, cannot work. In this pattern a row of fabric is formed by two half-rows.

Fig. 30

Fig. 31

Fig. 32

Fig. 30 shows the symbols (superimposed) for half-rows with thin and thick threads.

Fig. 31 shows the symbolic dash system with successive half-rows.

Fig. 32 shows the symbolic "continuous" system with successive half-rows.

To recapitulate (leaving aside the long question of the interlacing theory):

1. Plain knitted fabrics and derivatives are obtained from a single series of needles.

2. Rib knitted fabrics and derivatives are obtained from two series of needles working interlocked and simultaneously.

3. Purl knitted fabrics and derivatives are obtained from a single series of needles (special double-end needles) and worked on two beds in opposite directions.

4. Interlock knitted fabrics and derivatives are obtained from two coincidental series of needles, working in turn. The knitting industry, unlike the common weaving one, includes many categories of production machines but all the machines work according to the four fundamental principles above mentioned; that is, flat and circular machines, automatic or end-needle machines, large or small for hosiery or other knitting. The latter includes all knitted products of which hosiery represents one category.

Practical Application Of The R.G.T. Method

The practical application of the R.G.T. method gives precise instructions for "writting-up" interlacings of all kinds clearly and simply as the alphabet enables us to form words. This method is superfluous for uniform web productions with fundamental weaves but sometimes the name does describe the product quiate appropriately or is understood by many people in the industry, so it is very helpful to apply graphic representation which gives precise instruction for loop formation in all kinds of knitted fabrics. Moreover, the method takes into consideration not only didactic study but also gives clear indication as to whether or not it can be applied to any particular machine; whereas it can provide infallible instructions for the production of new patterns on specially equipped machines.

In other words the R.G.T. method establishes "the alphabet" (corresponding to the loops) with which to compose first the "words" (or rows) and then the "periods" (stitches) in which various rows may be technically harmonized.

Graphic Representation Of "Pulled" Loops

The two symbols for "simple" loops that we have examined so far do not cover all kinds of interlacing. In the weft knitted fabric

(*Continued on Page* 102)

the needle may be out of action for one or more rows, only gathering the thread without knocking the preceding loop. This last loop hung on the needle because of pulling forms a "pulled loop" in both cases. Technically we get pulled loops:

1. When the needle is not working, forming a "missed loop."
2. When the needle is working only partially, giving a "tucked loop."

Missed loop

Fig. 33 shows a missed loop in a wale and in a row on a plain loop fabric.

Fig. 34, an enlarged diagram. The first thread forms the "loop" the next one, the "float" pulling the loop.

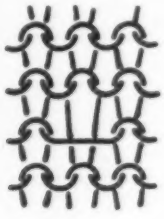

Fig. 33.

Fig. 34.

Fig. 35 and 36 are the symbols which show the "missed loop"; the needles is not working, so the relevant little square is "empty." All the empty squares indicate "float" formation or weft formation.

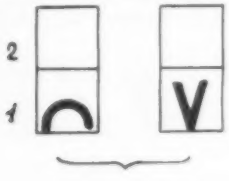

Fig. 35.

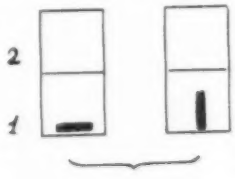

Fig. 36.

Tuck loop

Fig. 37. Here we have a basic fabric with plain loop; a "tuck" loop worked in a wale has been introduced in one row.

Fig. 38 shows the larger interlacing motif from which the float has been caught by the needle and carried up to the successive row forming a tuck by means of a half-rise or a half-fall of the needle.

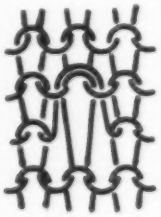

Fig. 37

Fig. 38.

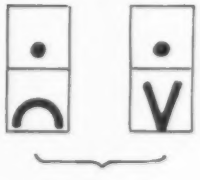

Fig. 39.

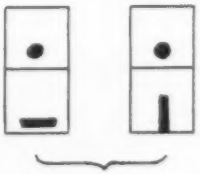

Fig. 40.

Fig. 39 shows symbols to indicate the tucking. This is represented by the black dot (or big point) because at this juncture there is no loop formation but only a tuck superimposed on the previous loop.

Fig 40 shows the same symbol, the big point.

To sum up, thus the fundamental symbols are four in number: vertical and horizontal strokes for simple loops), big point (for tuck loops) and a gap (missed loops); the position of the needles in the knitting machine and the subsequent variation of the working needles, are marked in the lower part, under the stitch so that lines or vertical walls of the symbols always show the work of one needle in the subsequent rows; and drive cams and thread in the subsequent formative phases is registered on the left side of the stitch so that at every row the lines or horizontal groups of symbols represent the work of a thread insertion for each row or course of the machine.

Graphic Representations of Special Loops

The symbols so far examined have been for simple and pulled loops. For other kinds of interlacings further instructions are needed to obtain fancy loops. Here is a complete table and variations of symbols for various fancy fabrics. All these conventional symbols indicate the work of the needle and the thread. They are required in cases in which phases of hand work or machine devices produce the formation of the fancy loop unlike the fundamental loop. The following diagrams, from 1 to 12, represent these "special signs" (Figs. 41 - 52):

Transferred loop (from one needle to right side)
Half-transferred loop (to right side)
Pelerine (eyelet) loop (on two needles, for one row)
Plated (vanise) loop
Plated loop with "needle off"
Plated loop with inverted thread
Fleeced loop (plated loop)
Warp loop
Knocking-off loop (with subsequent snag)
Tuck loop (at the beginning of the work)
Laid-in loop with float weft
Laid-in loop with tucking

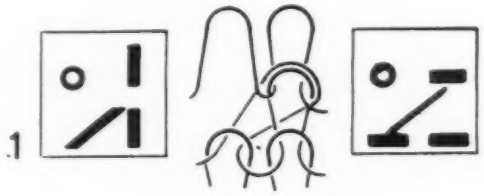

Fig. 41
Transferred loop (from one needle to right side).

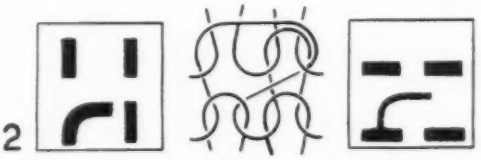

Fig. 42
Half-transferred loop (to right side).

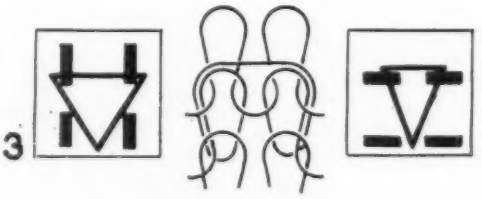

Fig. 43
Pelerine (eyelet) loop (on two needles, for one row).

(*Continued on Next Page*)

Fig. 44
Plated (vanise) loop.

Fig. 45
Plated loop with "needle off."

Fig. 46
Plated loop with inverted thread.

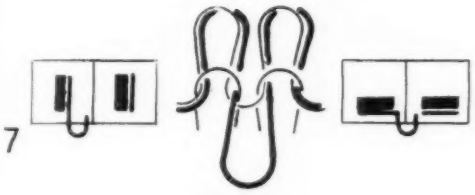

Fig. 47
Fleeced loop (plated loop).

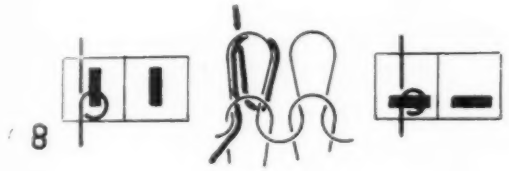

Fig. 48
Warp loop.

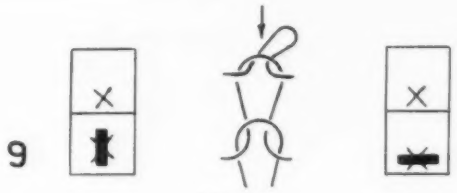

Fig. 49
Knocking-over loop (with subsequent snag).

Fig. 50
Tuck loop (at beginning of the work).

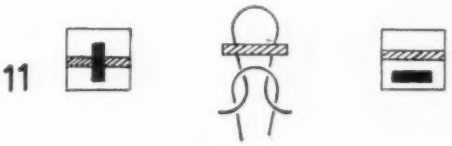

Fig. 51
Laid-in loop with float weft.

Fig. 52
Laid-in loop with tucking.

In all knitting machines there is a striping device that makes possible changing the insertion of the thread at every row or double row (turn) during the fabric formation. For cases where in the "flat" machine group this alteration occurs in two directions (alternated movement) or, in the "circular" machines, in one direction only (to right or left according to the direction of the rotary movement), a very simple device has been applied in the R.G.T. method, based on the black-outlined squared paper. A simple, inclined stroke (diagonal to the height of the row or to the thread insertion) shows the direction and the wale in which the connected guide thread works.

V-Bed Flat Full-Fashioned Unit Flown In

A revolutionary full-fashioning V-bed flat machine was flown to this country from West Germany last week via Seaboard and Western Airlines in time for its initial unveiling at the Knitting Arts Exhibition.

The machine was developed by Stonehill Knitting Machines Corp., Brooklyn, in collaboration with Universal Maschinenfabrik. Stonehill is the exclusive sales and service representative for this German knitting equipment company in the United States and Canada.

The new unit, claimed to be the first of its kind, is a fully automatic V-bed flat latch needle knitter in addition to incorporating provision for widening and narrowing on the same principle as these operations are performed on a Cotton's Patent spring beard needle machine.

In development for four years, the machine comes equipped with four yarn carriers. It is geared to produce collars, sweaters and trims automatically, all on a full-fashioned basis.

The principle involved represents a development far different from the techniques for widening and narrowing that are achieved on present day V-bed flat machines with conventional attachments.

Thus, it is possible to turn out sweater-strips with varied designs spotted throughout the garment that is a single full length design or with variations of solid structure and jacquard patterning.

The knitting of the rib cuff may be in 1 x 1 or 2 x 2 construction. When knitting two-color designs, the cuff is produced on every other feed. If three colors, at every third feed and if solid color on all feeds. As many courses as desired can be introduced in the cuff, a method characteristic of versatile V-bed flat knitting. The actual knitting of the cuff is done by two short needles and one long needle in dial and cylinder.

Philip Multi-Use Sweater-Strip

(*Continued from Page* 23)

half and full cardigan with or without racking, eyelet fabrics, interlock and double jersey structures as well as genuine links stitches.

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In the manufacture of jacquard designs in color, the pattern is produced without spiral. The height of the jacquard design can be in any desired dimension in the sweater-strip and can be altered and positioned in any part of the garment desired.

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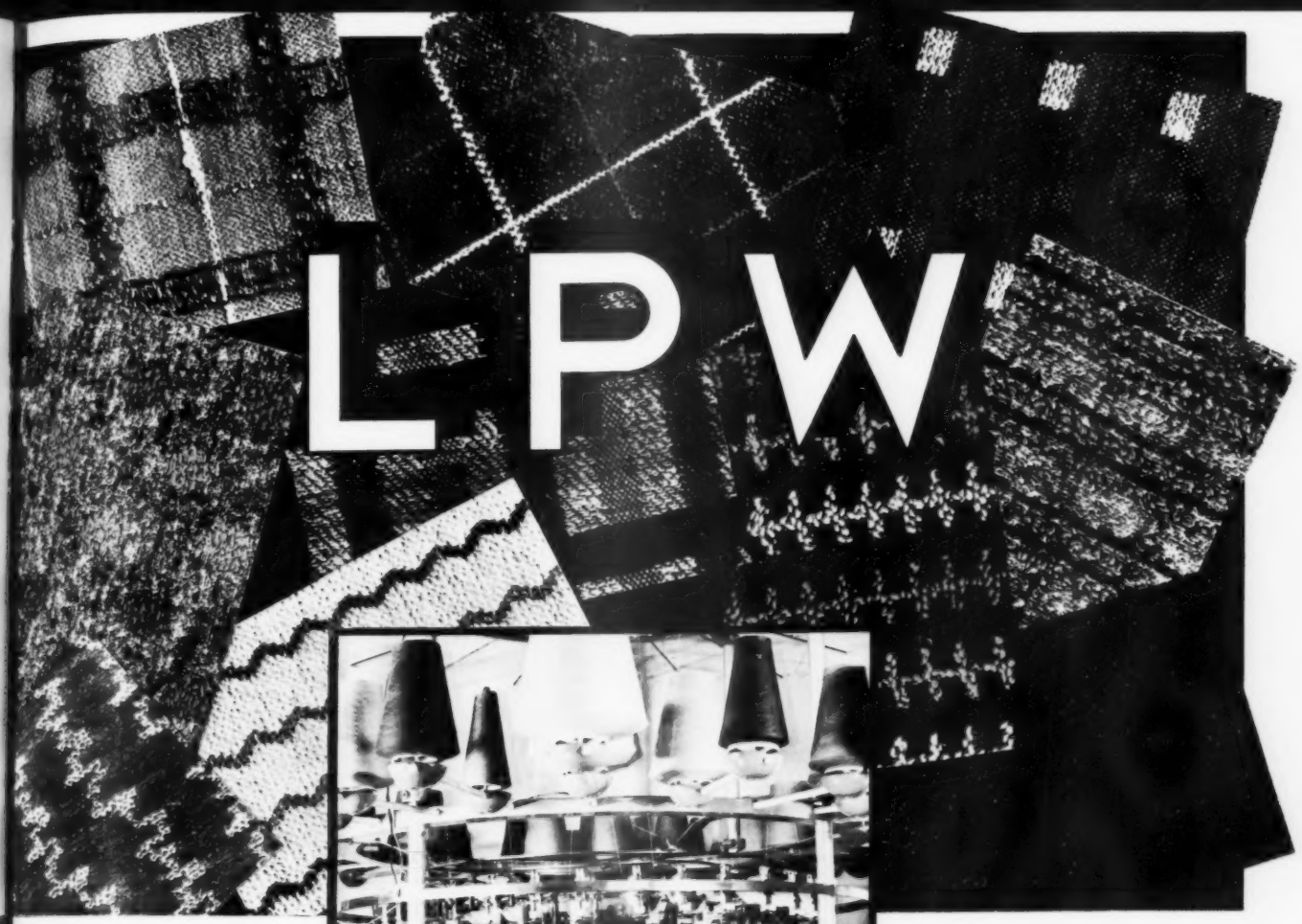

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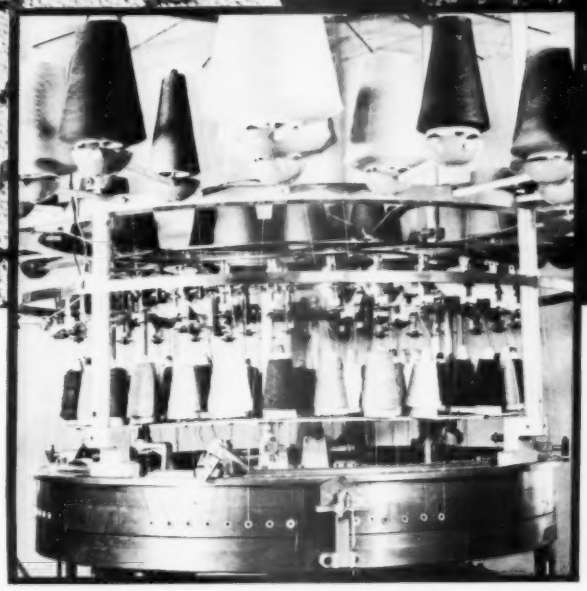

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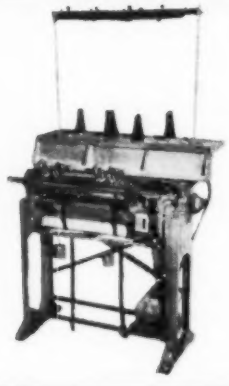

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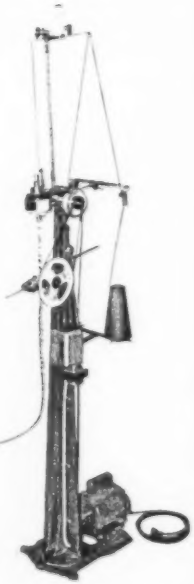

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New Karl Mayer Rotary-Rapid

(*Continued from Page* 37)

level at which overlapping takes place and the to-and-fro horizontal displacement of the holes in the guide bars is 12 mm.

The Rotary-Rapid machine can be adapted to use either pattern wheels or chain links for shogging the guide bars. Three-link motions are standard but two-link motions and four-link motions are also possible. Pattern wheel capacity extends to a limit of 48 courses with a maximum lateral displacement of 48 needle spaces.

Operating Rate

Cruising speeds are influenced in some measure by the extent of the lapping movements that have to be made by the guide bars but under favorable conditions 1,000 courses can be knitted per minute on needlebeds 168 inches wide and 1,100 courses on needlebed 84 inches wide.

Embodied in the new machine is an improved let-off motion which dispenses with the rubber ring passing around the warp beam. The new arrangement consisting of two felt-covered spring-ioaded rollers which rest on the surface of the yarn on the beam is neater, more effective, and much easier to set up. Correction for beam speed as off-winding takes place is made mechanically through a pair of cone-shaped pulleys, and there are change wheels, made more sensitive by stepped driving and driven pulleys, to adjust the run-in from each beam according to requirements.

New Drive

A new feature is the provision of a P.I.V. drive by means of which the run-in from both beams can be changed synchronously as and when necessary. Two beams having flanges up to 30 inches in diameter can be accommodated. Cantilever springs give a smooth flow of warp sheet to each guide bar. Let off mechanisms and guide bar shogging apparatus, housed in closed boxes, run in oil baths.

The take-up mechanism comprises four rollers covered with a rubber-nylon composition material that exerts a firm grip on the fabric across the full knitting width.

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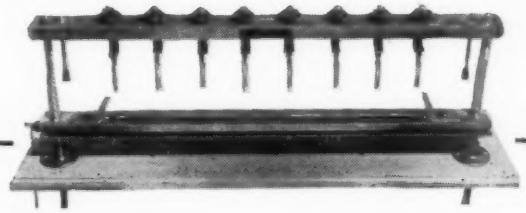

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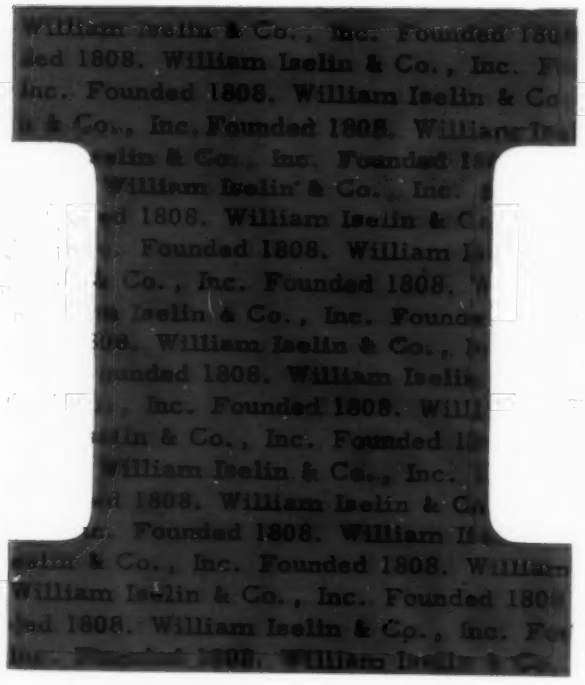

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Warp Knitting Developments

(*Continued from Page* 34)

regular swing movement and the task of lapping yarn around the needles is performed by a special sinker and comb arrangement. Because of individual jacquard control of the comb elements, it is possible to combine different stitches on selected needles within the same course.

SINKER BAR ASSEMBLY AND OPERATION — The sinker leads being heavier than either needle or guide units, became a prime target of machine designers in their endeavors to reduce the weight of moving parts. It will be remembered, the sinkers are cast into lead at both ends. Mayer attempted to remove lead from the sinker heads, but this proved unsuccessful on account of vibration of the unsupported sinker blades. The latest Mayer sinkers again have leaded heads, but only to a minimum extent consistent with good knitting efficiency. The sinker belly has also been shortened to reduce its stroke.

F.N.F. modified the contour of sinker throats to exercise better stitch control at the instance of knocking over. The sinker nib or nose has been rounded off to provide better engagement of laps and prevent filamentation of yarn.

To facilitate adjustment in depth of knockover, the entire sinker bar assembly may be moved in the vertical direction by turning a handwheel. The horizontal throw of the sinkers may be regulated by carrying out a simple adjustment on the bar rocker arms which previously could only be effected by manipulation of many screws, nuts, and bolts.

Sinkers play an important part in enabling the bearded needle tricot machines to knit Raschel style meshes and marquisettes based on the pillar inlay stitch. Because the pillar is at right angles to the needle stem and not subject to direct sinker control, it has a tendency to rise with the needles and load them.

The purpose of the new sinkers is to control the pillars by preventing them from raising with the needles. This is accomplished either by making the sinkers of split, bipartite construction and shogging one part.

(*Continued on Page* 113)

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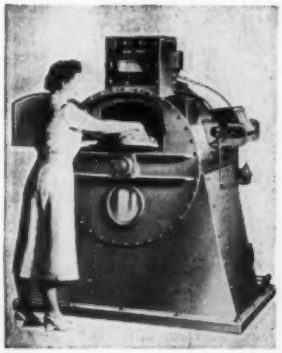

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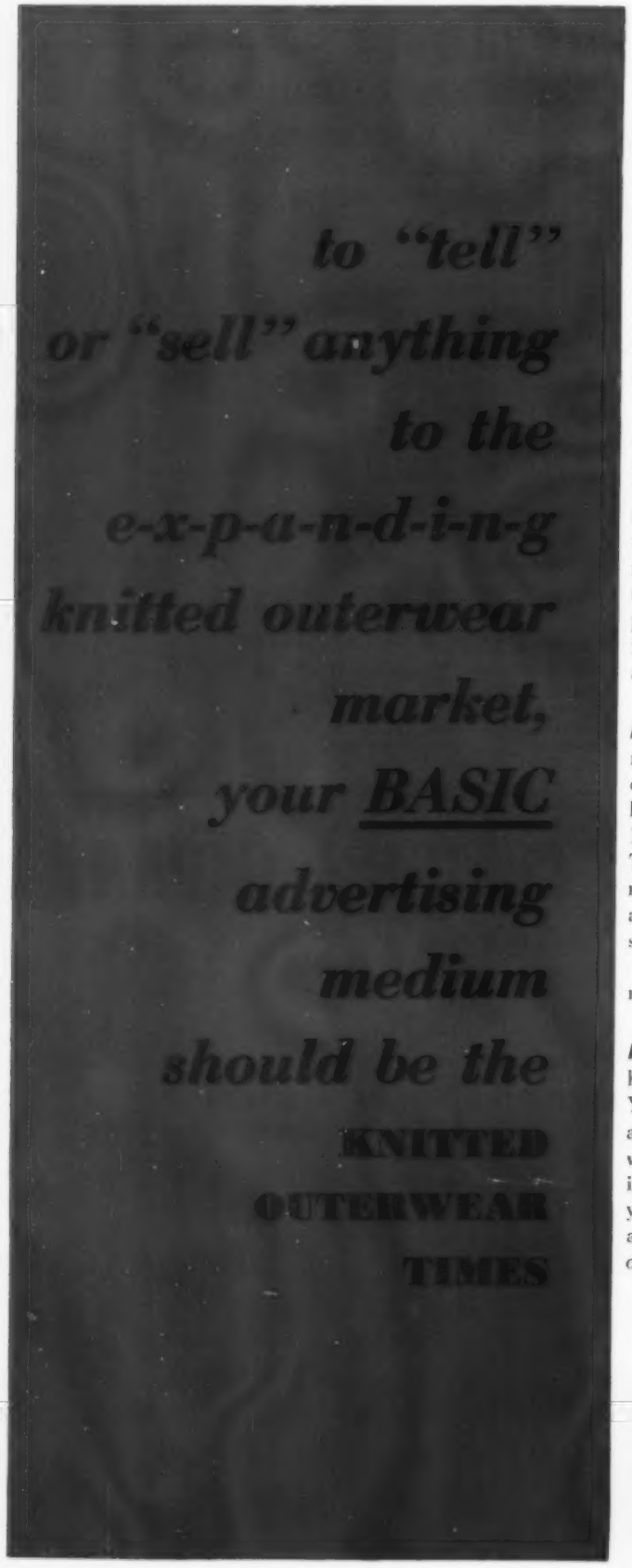

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MORE of the RIGHT READERS . . . Because the TIMES caters to only one industry — Knitted Outerwear and Swimwear — it naturally can do a better circulation job within that one industry. That's why, today, the TIMES — with its specialized circulation of over 3500 — reaches over 98% of the knitting mills and knitwear jobbing firms in America, plus several hundred in Canada and abroad. *No other publication can match this blanket coverage.*

MORE of the RIGHT EDITORIAL MATERIAL . . . Because in its news and editorial columns, the TIMES presents the full and authoritative picture of the knitted outerwear industry — it is by far the knitwear industry's "most read, first read and best read" trade publication. Each week, the TIMES carries more exclusive and original information on market conditions, availability of raw materials and equipment, style trends and technical subjects than all other general, textile and apparel publications combined. And because the TIMES is published weekly, its news is timely and to the point. Its technical articles are acknowledged as "must" reading.

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Knitted Outerwear Times

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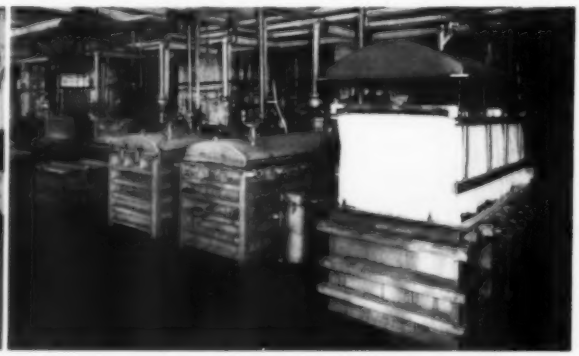
THE MORGAN LABORATORY is, we believe, second to none in the industry. Here our color research is done, new formulas worked out, old ones rechecked. Here, methods and procedures are subjected to careful testing on small scale equipment. No effort or expense has been spared to give the skilled Morgan chemists the finest tools of their trade.

QUALITY CONTROL in Morgan Dyeing consists of many things. Important, for example, is this wide array of dye-stuff and chemical samples; the delicate precision scales for weight measurements; hand operated winding frame. Equally important are shelves of reference volumes and (not shown) files of customer records to assure accuracy of reorders.

HUGE PACKAGE DYEING KETTLES at Morgan turn out millions of pounds of cost saving package-dyed yarns every year. Thanks to special Morgan-developed techniques, even Turbo Orlon and Hi-Bulk Orlon are now being package-dyed successfully, in addition to quantities of regular Orlon and other fibers.



THE MORGAN SKEIN DYEING DEPARTMENT includes this battery of highly specialized Scholl Tanks. This most advanced type of skein dyeing equipment known to the industry dyes even Hi-Bulk Orlon under precisely regulated temperature and pressure, yielding true color without sacrifice of hand or dimension.

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CAREFUL HANDLING OF EVERY ORDER extends beyond the mere processing of fibers and yarns in the dye tanks. From the moment your order is placed until it is delivered, you are assured of conscientious attention to detail. Above, in the Morgan Shipping Room, meticulous last-minute checks and counter-checks are made before your order leaves our door.

WAREHOUSING AND DISPATCH are vital factors to Morgan customer service. Recent additions to our warehousing and shipping facilities help to speed orders on their way without costly delays. Railway, trucking and air transportation work together to assure prompt delivery. Above, a railway freight car loads at a Morgan shipping dock.

Through Service we grow

MORGAN DYEING & BLEACHING CO., INC. • ROCHELLE, ILLINOIS

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or by using solid sinkers and shogging the entire bar. The top movable part of split sinkers holds down the pillars by engaging the yarn itself, while the solid sinker impinges on the last row of loops and prevents them from moving up with the needles.

We shall now review the various pieces of equipment which recently staged a debut on the world's markets.

U. S. A.—The only domestic tricot machine builder, Textile Machine Works, continued to introduce refinements on their well known 2- and 3-bar models, particularly in the let-off mechanism. Rumors of another American builder entering the tricot field with a super speed unit have not materialized to date.

There are now three types of domestic-built warpers—Cocker, Kidde and Reiner, all capable of high speed operation and accommodating beams up to 32 inches in diameter and 42 inches in length. They feature automatic beam loading and doffing and constant, preset yarn speed maintained by tachometer-generator or rheostatic devices. The accent is on warping of unthrown materials with a minimum of filamentation and uniform beam density.

Creel tensions and warp scanners received a good deal of attention. Improved electromagnetic and mechanical tensions developed expressly for unthrown yarns are now available.

ENGLAND — The most interesting development here is the Swanwarp pattern unit applied on Hobley's standard 2-bar machine. The basic idea of Swanwarp is the creation of design effects by altering the stitch density at predetermined points of the ground fabric. This is accomplished by lifting selected groups of warp threads which increases their tension to tighten up the loops.

Selection of threads is performed by chains carrying studs attached at the appropriate location, as stipulated by the design being knit. The studs operate the hook system which, in turn, controls groups of threads. The selected groups will be lifted to produce small designs of dense, constricted loops standing out boldly from a plain ground. There is no restriction on ground construction or yarns used and

(*Continued on Page* 117)

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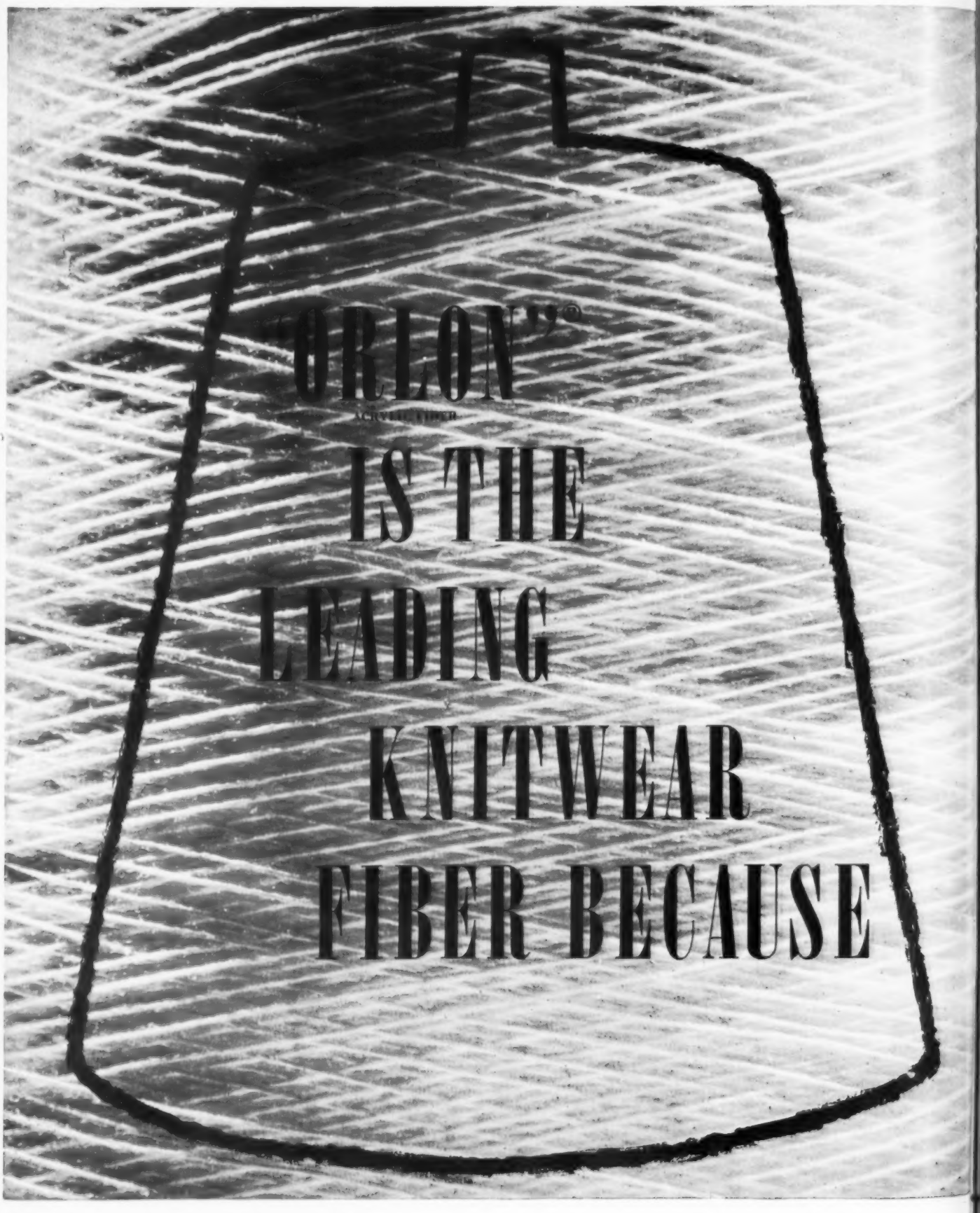
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it's in the air...

a new viewpoint on SILK knits

The easiest answer on earth to travel in the jet age—not only the established successes; Silk knit separates and dresses of carefree elegance, but novelties too are taking the cue from silk: silk knit ski underwear, men's polo shirts, silk knit neckties, swimsuits and beach apparel, all with an important new look in Silk . . . and important profit opportunities.

International Silk Association (U.S.A.)

the pattern scope is very extensive. The machine may be run at its normal cruising speed.

Hobley Ltd. boosted the speed of their standard 2-bar machines by fitting a power driven let-off motion. Rates up to 750 courses per minute are claimed which is very high considering they still utilize the orthodox cam and counter cam drive. Hobley also introduced a 4-bar machine with four independent let-off motions, either of expanding brake or power assisted type. Speeds in excess of 400 are claimed.

The builders of F.N.F. machinery brought out an improved 3-bar model available in 84-inch-126-inch width and a full range of gauges from 14-32. The modified guide bar motion permits pillar chaining over a large number of consecutive courses which makes the machine ideally suited for marquisette curtain fabrics. No special attachments are necessary for this type of work. A realistic speed of 750 courses per minute is quoted by the builders.

JAPAN—Very few people are aware of the fact that Japan, hitherto a mass importer of warp knit equipment, has turned into a tricot machine builder and is now making a preliminary bid for export markets. The machines are assembled by Tsugami Mfg. Co. Ltd. of Nagaoka, builders of metal working machines and precision tools.

In keeping with traditional practice, the Japanese entered the tricot machinery field by copying a successful European model (Mayer) almost to the last bolt and nut. One may, however, expect, once the Japanese establish themselves in this "new to them" field, they will proceed to evolve their own units and contribute to progress just as they did with spinning, weaving, printing and other textile equipment.

Tsugami offers two models. One is 2-bar, 28 gauge and 120 inches wide, while the other is 3-bar, 18 gauge and 120 inches wide. Speeds of 800 courses per minute and 600 courses per minute respectively, are claimed. The choice of gauge for the 3-bar machine and that of width is rather difficult to comprehend

(*Continued on Page* 123)

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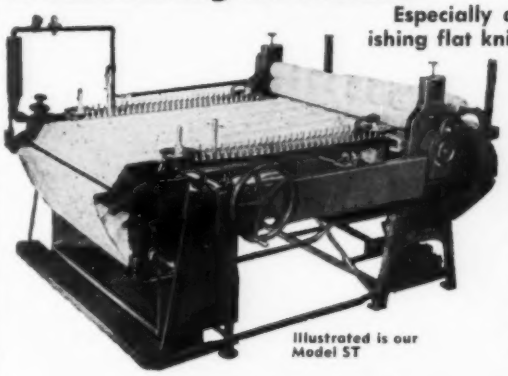

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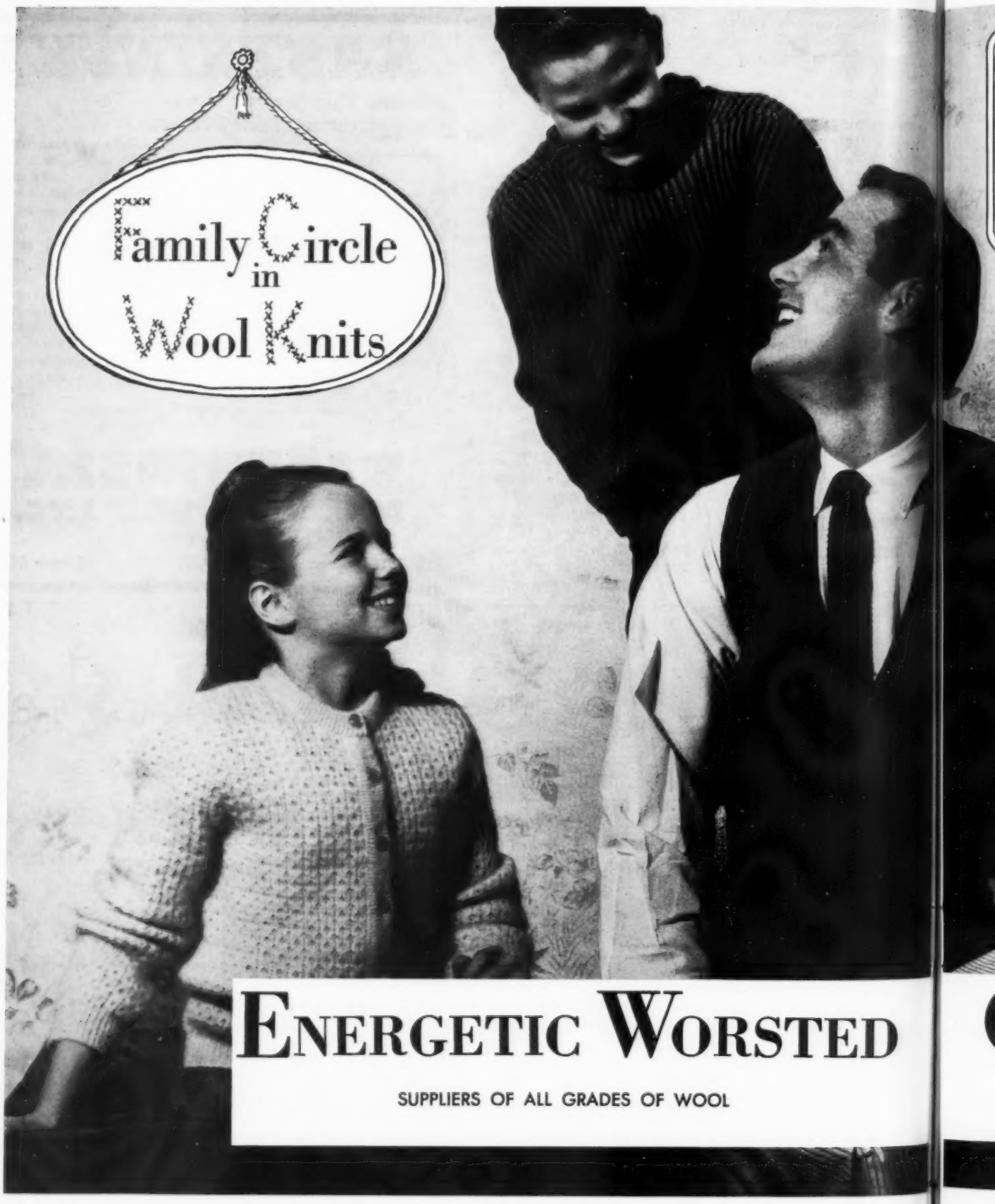

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These are numerous virtues that make wool the "first" fiber with everyone, from consumer and retailer through every link in the production chain.

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RETAILER

Wool builds prestige because it spells quality, richness and full value received. Customers do not have to be educated on wool qualities; they are never confused. Wool satisfies; satisfied customers mean more business on a better mark-up.

KNITTER

Wool has no handling problems; works through machines with ease; never varies in its natural quality. Wool has a softness that enhances richness and texture of knitted fabrics.

SPINNER

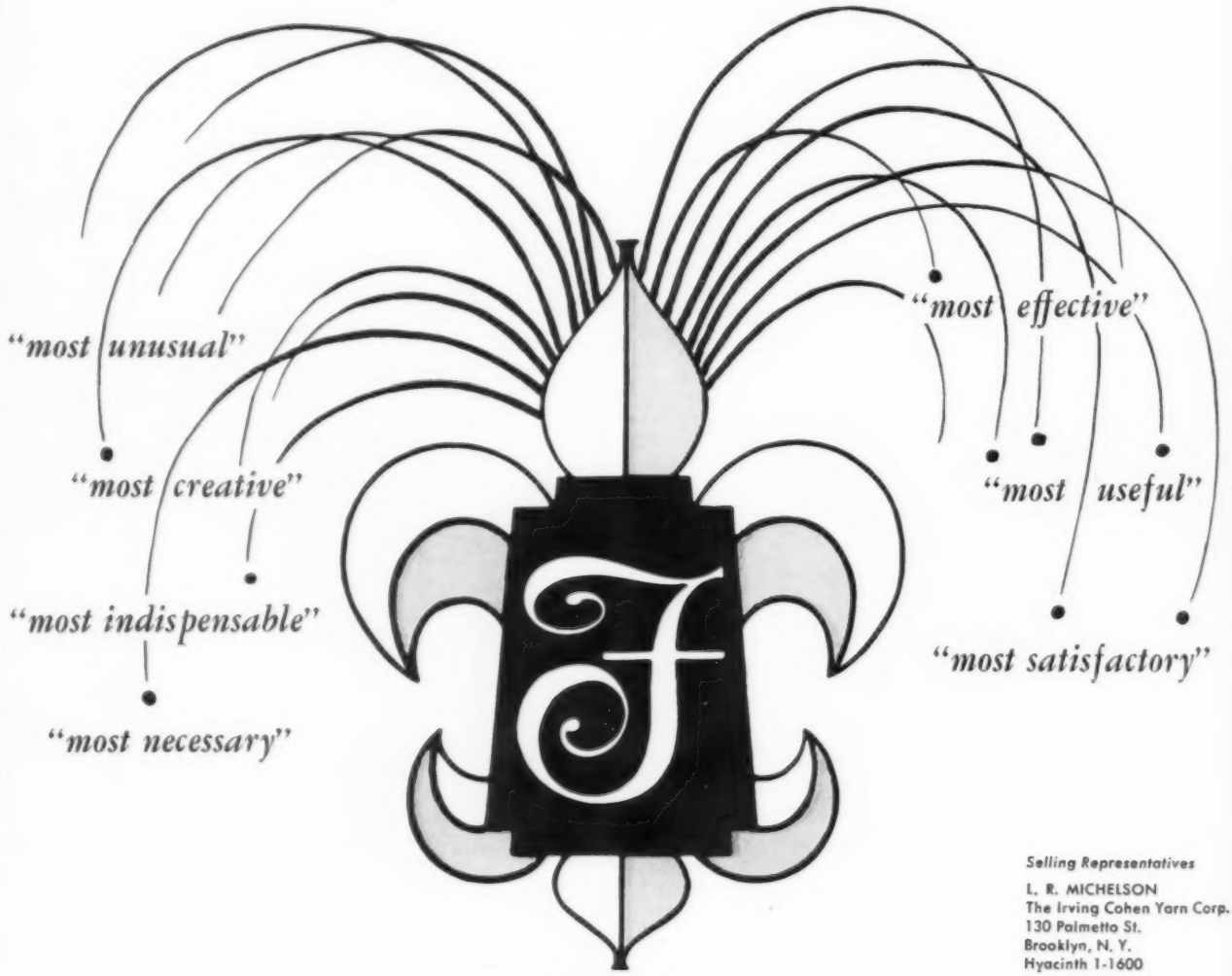
No time or money wasted in trial and error when working with wool . . . can be handled without special controls. Wool runs better on machines. It is always reliable; its performance is proven.

DYER

Wool is less costly to dye; dyeing is easier, doesn't require special machinery. Wool is easier to wind. Wool takes the widest range of shades, with no color-matching difficulties.

Walter Daniel

French Inspires the Superlative



Established in 1906

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says L. R. Michelson of The Irving Cohen Yarn Corp., Selling Representative for THE FRENCH WORSTED CO.

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We're proud of our role in providing knitting yarns—the very essential raw materials—that have chalked up a successful page for knitwear in fashion history. We make it our business to sell on the basis of highest quality and prestige.

Leading knitters turn to French Worsted because:

1. Grade for grade, they are supplied with yarns of the **very highest quality.**
2. Yarns are **always uniform.** Knitters know that this quality **never deviates** from order to order; from season to season.
3. "Never oversell," is our motto. Most important to us is to supply service when it is most needed. Since our accounts are **deliberately** selected, customers know that they can count on prompt service, **even at the height of the season.**
4. French Worsted is staffed by experts — all under one roof — who have enormous versatility. It is stimulating to watch them perform, creating yarns **on demand** for every need, for every texture and surface interest.
5. Sample needs are willingly supplied to our customers.

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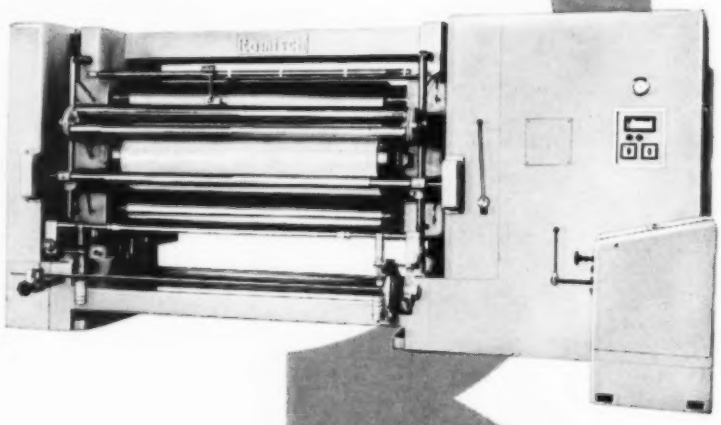

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since both would find very little acceptance in U.S.A. or Europe.

WEST GERMANY—This country further consolidated her leadership in the sphere of warp knit technology with the introduction of basically new models and refinements of existing ones. Tricot and Raschel machinery seem to be tailor-made objects for the Teutonic cult of precision and flair for fine mechanic.

The most recent addition to Karl Mayer's stable of fast tricot machines is the new Super-Rapid provided with eccentric drive instead of contour cams. All the principal knitting element motions are developed from a system of single eccentrics and cooperating linkages.

Roller bearings are used on all eccentric races and rocker pivots. The needles have a modified, rectangular stem cross section to increase their rigidity in fabric direction. They are of butted type and mounted in tricks milled out in the needle bar. The tricked part of the latter is split into five sections individually replaceable in case of trick breakage. Butted needles have been used on and off in tricot knitting for a long time. They were never enthusiastically received on account of the danger of trick failure, difficulty in pliering and tendency to go "off gauge" sooner than leaded needles.

The let-off motion control mechanism previously incorporating rubber band driven by frictional contact with warp circumference, now features felt covered rollers pressed against the warp and signalling its linear speed to the feed regulating drive. The runners are set on each let off by fitting suitable change gears. Once set, the runner ratio remains constant for duration of the warp. The opposed cone variable speed drive for the beams has been retained in unchanged form.

The let-off modifications were necessary to ensure more consistent yarn feed for all knitting qualities and beam diameters. The machine is said to cruise at 1,000 courses per minute on 84-inch width.

Only minor refinements have been made on Mayer's 3- and 4-bar cam driven machines. The let-off motions, take up and motor drive were streamlined and rendered more efficient. Certain

(*Continued on Page* 127)

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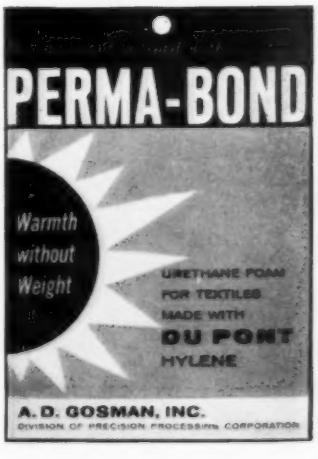
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types of 3-bar machines may be equipped with a pillar/inlay arrangement for manufacture of marquisettes. Also cut press attachment may be fitted with one or two pattern press bars. The machines can be delivered with either friction or power let off. They come in widths of 84-124 inches and 13-28 gauges.

Liba put on the market a new range of Excentra models in 2-, 3-, and 4-bars. The original Excentra line gained ground rapidly in European mills since its first debut some three years ago. Like the Super-Rapid, the Excentra derives its motion for knitting element bars from a single system of eccentrics with cooperating conrods and lever. The entire assembly works in oil bath and all parts are pressure lubricated. The rocker shafts are hollow and filled with oil to ensure dependable supply of lubricant to their bearings. The previous let-off motion based on tension balance has now been replaced with a warp speed control mechanism steered from roller driven through contact with beams.

Blind lapping is obtained by stopping and starting the beam drive in accordance with signls relayed to the let-off from microswitches operated by special chains.

The take-up motion has been redesigned to accommodate fabric rolls measuring up to 800 yards in length (on 30 denier nylon). The knitting elements are cast into an alloy of much reduced specific weight. New guide bar spring loading arrangement has been provided. Instead of straining the spring in extension, it is now loaded in compression and constrained in a yoke which oscillates with the guide bar assembly. This lessens the danger of bad needle or guide smashes in case of spring failure.

Another Liba model which merits attention is Type 39 T expressly built for volume production of tulles and marquisettes. This machine is actually a modified version of the well tried Liba LSZ 37 two bar unit.

Pillar control is obtained from a split sinker bar assembly. The top part of the sinkers shaped like a wedge engages the threads by moving forward and then sideways to hold the fabric down. Because of location and angle of the movable sinkers, the presser

(*Continued on Page* 131)

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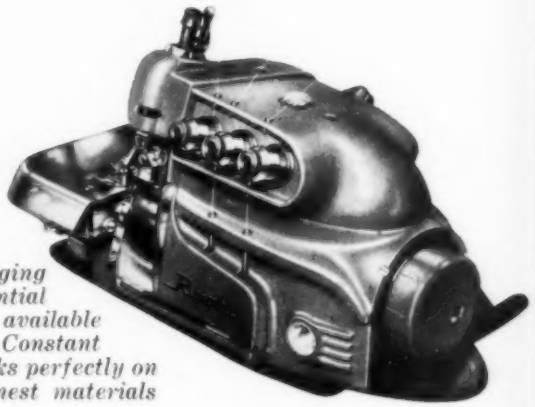

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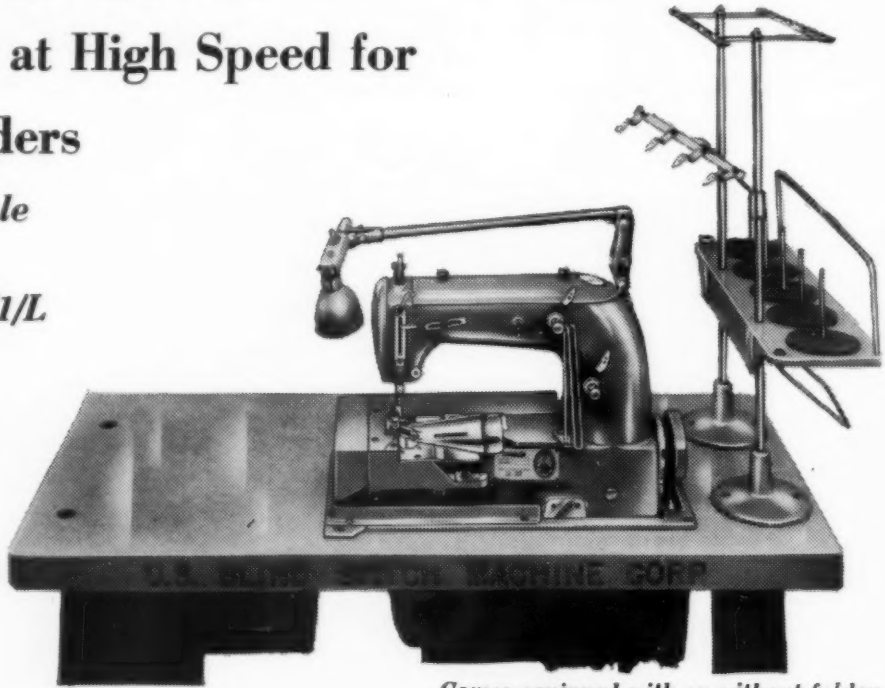

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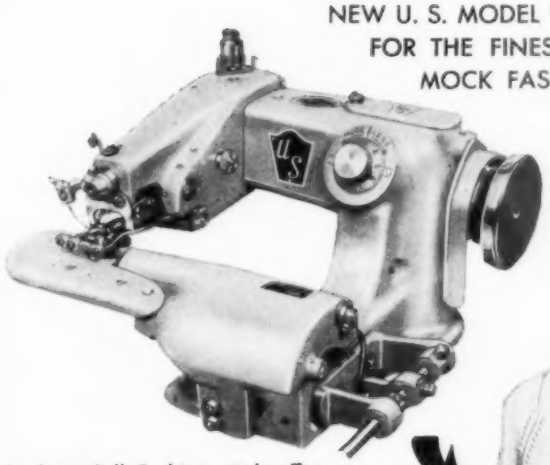

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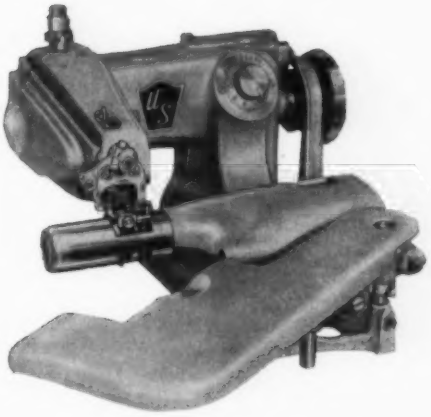

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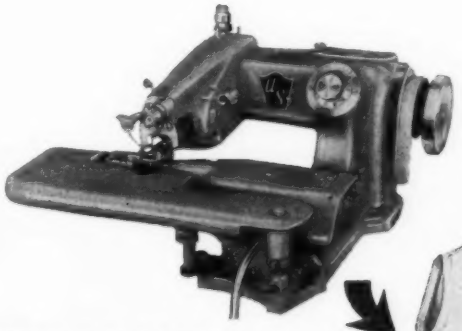

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must be so fashioned as to fit between the two adjacent blades and still be able to press the individual needles. The machine is available in gauges 24-28 and widths 84 inches - 170 inches. The cruising speed is given as 800 courses per minute.

EAST GERMANY — Here, the progress has been perhaps even more spectacular than in the Western part. The following new or greatly improved models have been introduced.

1. Kokket type 5215, 2-bar machine.
2. Favorit 2-bar machine.
3. Type 5216 4-bar machine.
4. Type 5200 4-bar machine.
5. Type 05300, circular Milanese machine.
6. Diagonal-Rapid, flat Milanese machine.

KOKKET MACHINE — This is an extremely interesting development since it involves application of a compound type needle similar in function to that of the F.N.F. The hook member of the needle and slide wire fitting in the groove of the hook stem are mounted on individual bars and actuated from a single system of cranks and levers. The advantage of compound needles lies in the shortness of their stroke as compared to bearded needles of the same gauge (both needle members move in opposition to reduce the total travel). The dimunitive needle stroke coupled with the absence of presser pounding action results in smooth and quiet running.

The let-off motion is purely mechanical and governed by the warp tension through tension bar and linkage. Constant yarn delivery is maintained by a pair of differentials operating a friction drive. The runners are preset to required length by fitting a suitable change wheel in the gear train. The let-off transmission derives its power from the crankshaft. The entire mechanism is clean and compact.

The pattern drive, on the other hand, is clumsy and rather old fashioned. It consists of a pivoted vertical lever in contact with chain or wheel imparting the shog movement to guide bar via a pushrod. These parts are kept in contact by a powerful compression spring acting on the guide bar through a lever and steel cable. It is obvious the builders endeavored to eliminate the customary pushslides and the attendant lubrication problems. The machine has an attractive appearance with all

(*Continued on Page* 133)

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*DuPont's Acrylic Fiber

mechanisms neatly enclosed. Kokkett, built by VEB Wirkmaschienenbau, Limbach, is available in gauges 22-30 and 84 inches width. The top speed is claimed to be 1200 courses a minute.

FAVORIT — This remarkable machine introduced about a decade ago was the first bearded needle model to reach the 1,000 courses per minute mark at a time when other contemporary units were running at a little over half that speed. This high performance was attained thanks to the following features: (1) Employment of cranks and compound levers and (2) elimination of guide bar swing by making the needle bar execute a figure "8" movement.

The guide bars are merely imparted shog motion from conventional pattern wheels. Despite the fact that Favorit has been on the market for quite some time, no general description of the machine appeared in trade publications.

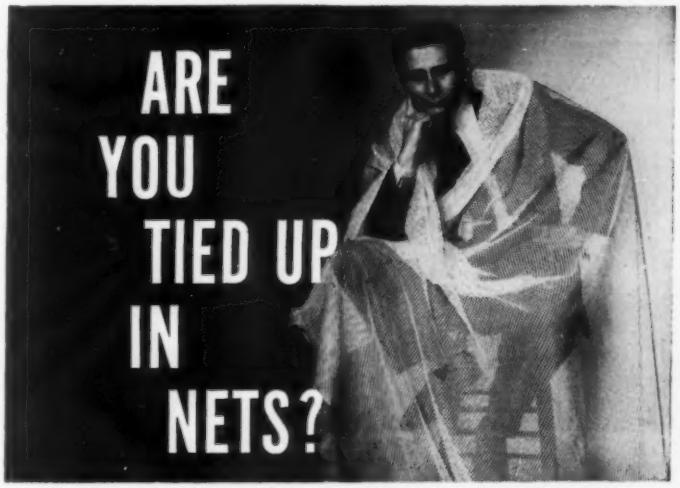
More information on this machine may be found in German patents No. 892,813 and 931,493.

The let-off consists of a hydraulic transmission operated by a valve and controlled from the warp tension bar. Favorit is built by E. Wirth of Hartmansdorf, E. Germany. Its reputed to run up to 1200 courses per minute on standard constructions. The machine is available in 84 and 112 inch and in 28 gauge only.

TYPE 5216, 4-BAR MACHINE —This is the first 4-bar unit built in East Germany (by VEB Wirkmaschienenbau, Limbach). It does not embody any outstanding mechanical features. The machine is provided with conventional cams. The two back beams are driven by power let-offs of identical construction as those on Kokett model. The two top beams have a friction cone drive similar to the old Saupe let-off. The machine designers assumed, in author's opinion, wrongly, that top bars are invariably used for patterning and therefore do not require heavy beams and elaborate gear to drive them.

The machine may be equipped, if desired, with a cut press and marquisette attachment. The latter would be used

(*Continued on Page* 135)



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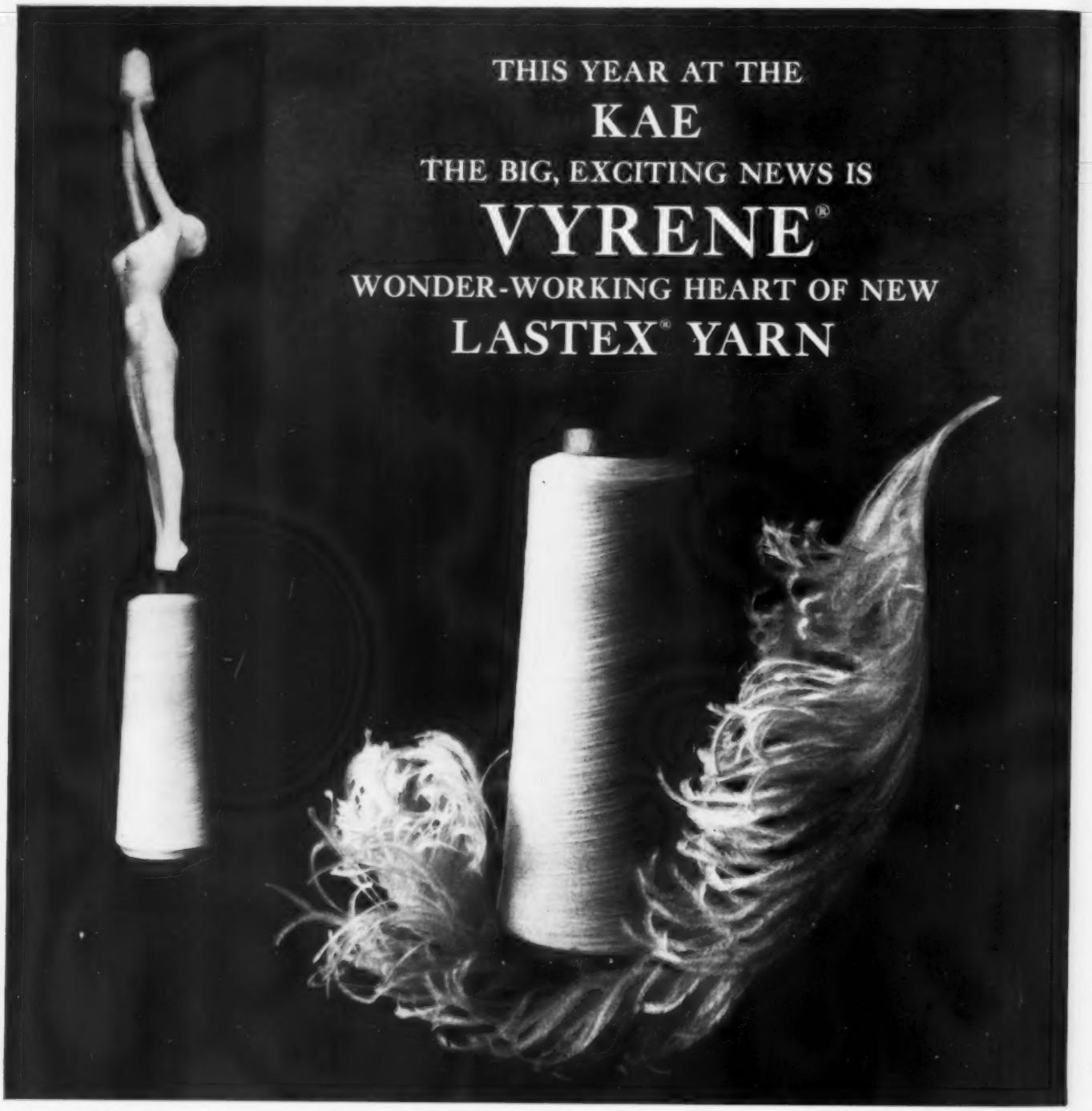

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for knitting of patterned curtains on marquisette ground.

The superstructure carrying the top beams may be dismounted if the machine is to be converted into a two bar unit. This lowers the center of gravity and so lessens intensity of vibration. The machine is available in 84 inch width and 22-30 gauge range. Top speeds are given as follows: On 2-bars—700 courses per minute. On 3-bar—600 courses per minute. 4-bar—500 courses per minute.

TYPE 5200 KETTEN RASCHEL — This machine, although called Raschel, is in reality nothing but a coarse gauge tricot fitted with cut press and other attachments for manufacture of novelty outerwear cloth. The machine mounts four guide bars and a special mechanism for shifting the needle bar off its regular and onto special cams to produce tuck effect. This is obtained by missing the knock over stroke for several consecutive courses resulting in accumulation of loops.

All machine motions are developed from conventional cam system. There are two coaxially mounted chain drums; one for operating the guide bars, the other for presser bars. The machine has a streamlined appearance with all parts safely enclosed. Although no performance claims are made, the machine should be capable of running at twice the speed of its predecessors, i.e., around 300 courses per minute.

TYPE 05300 CIRCULAR MILANESE — The field of Milanese merchandise, although almost extinct in this country, continues to receive attention in Europe where it manages to hold a small corner of the yardgoods market. The latest East German circular Milanese model was developed to improve the productivity of earlier equipment. The new unit can reach a speed of 600 courses per minute which amounts to 20 per cent increase over previous models of West German manufacture. This has been accomplished by reduction in the knock over stroke of the latch needles from 15/16 milimeters down to 9/16.. The needles are given a collective compound movement in both vertical and horizontal plane to engage the yarn

(*Continued on Page* 137)

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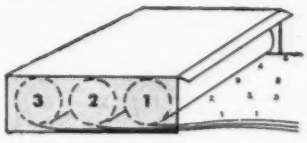

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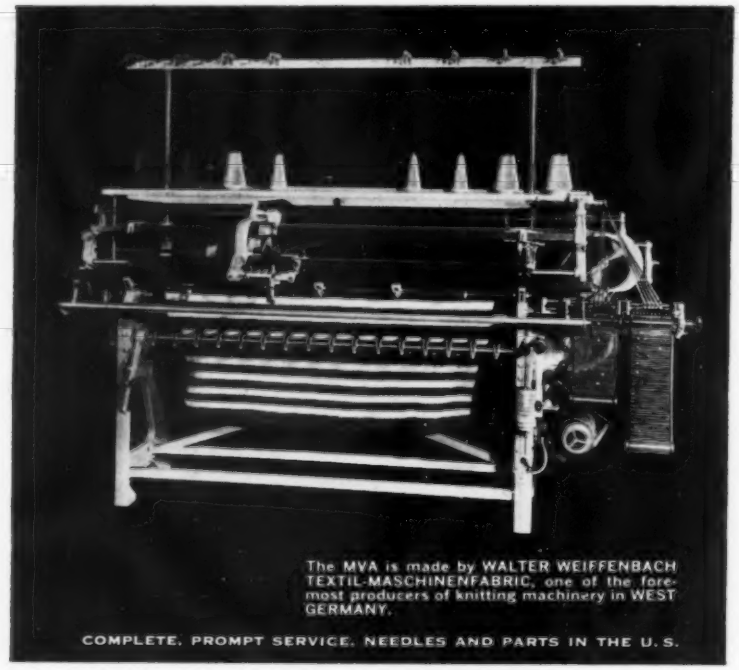

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JA-4

See This Machine At Booth 225 — Knitting Arts Exhibition — Atlantic City — April 24-28, 1961

crosses formed by rotation of warp spools.

The machine is 27.5 inch in diameter and available in 12, 18 and 26 gauge. There are two systems of beams, each consisting of eight spools about 11 inches long and 8.75 inches in diameter. The machine is built by VEB Rund und Flachstrickmaschienenbau.

DIAGONAL-RAPID FLAT MILANESE LOOM — Flat Milanese merchandise earned in the prewar days the worthy name of "queen of knit fabrics," especially when made of silk. Indeed, it had a supple hand, smooth texture, excellent all round elasticity, drape and freedom from running which rendered it an ideal underwear material. Unfortunately, the machine builders were not able to solve the problem of warp manipulation in a way conducive to high speed operation and consequently the maximum speeds were limited to 170-200 courses per minute. After the war, the low productivity of the Milanese loom affected the economy of its products to a point where decline and ultimate extinction became inevitable. The appearance of the Diagonal-Rapid loom should give this lingering trade a new lease on life.

The principal reason which leads to attainment of higher speeds was elimination of guide bar swing which was accomplished by imparting the needle bar a figure of "8" motion. The guide units merely receive a unidirectional, continuous shog from small pattern wheels located in the center of the machine. Shogs up to three needles are possible. The warp spools, 10 inch in diameter and five inches wide, are mounted on individual carriages and traversed in unison with the guides along an elliptical track. The machine, built by E. Wirth, has 84 inch working width and comes in 28 gauge only.

WARPING EQUIPMENT — A number of new warpers, creels, tension devices, etc. has been introduced by West German builders, notably Mayer and Liba. This warping equipment follows the current practice of power beam handling, automatic control of linear warping speed, synchronized braking on

(*Continued on Page* 139)

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the spool spindle, guide and presser roll, etc.

In comparison to American models, the German units are less complex and feature fewer controls, automatic devices and involved electronic circuitry liable to precipitate trouble. Thanks to their relative simplicity, the German warpers are priced well below our domestic counterparts. It is, however, too early to say whether or not the simplified construction will reflect on performance and durability of this equipment.

Raschel Developments

With the exception of jacquard curtain machines, no revolutionary new equipment has been placed on the market in the last two years. The contest for highest guide bar complement between Kidde, Mayer and Barfuss ended in a draw, and no dramatic developments should be expected here.

The competition among machine builders has now shifted to pursuit of the speed crown. Production rates of 500 courses per minute are currently being claimed for multibar lace Raschels. Only a few years ago this rate was scarcely applicable to 2-bar plain net.

The area where noteworthy progress in equipment and techniques had taken place within last two years are: (1) High speed lace manufacture; (2) marquisette curtains; (3) elastic fabrics; (4) carpeting and pile fabrics; and (5) nets.

HIGH SPEED LACE MANUFACTURE—The economics of multibar lace manufacture make it imperative to produce the merchandise at the fastest possible rate due to the fact that the cost of knitting exceeds the price of the raw material. This is not the case with nets, tulles, waffle cloth, carpeting or any other Raschel product where the yarn is several times more expensive than its conversion into fabric. Increases in operational speeds have been accomplished by: (a) reduction in the arc of guide bar swing through greater flexibility in their "nesting" arrangement; (b) dynamic balancing of camshaft and lever assembly, decrease in the mass of moving parts, shortening of the needle stroke, more rigid beam rack and other mechanical refine-

(*Continued on Page* 141)

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ments; and (c) better control of guide bar shog movement through appropriate timing and construction of the pattern mechanism (oscillating pushrod levers, long pushrods, individual ground and pattern drums).

The new 14-bar Mayer Super Garant lace model provides a good example of the extended "nesting" freedom. Normally, the guide bar assembly is nested as follows: Bar 1, 2 & 3 works individually; 4, 5, 6, 7 nested together, 8, 9, 10, 11—together; 12, 13—together; 14 works individually. This may be modified to reduce swing by nesting bar 14 with 12, 13. Any other arrangement is available with minimum of two bars and maximum of four bars per nesting with the exception of bar 14.

The new machine may reach speeds up to 425-450 courses per minute which represents considerable increase over past performance. Another addition to the fast lace equipment is Model HR 8, mounting eight guide bars and built by W. Barfuss of Wilhelmshaven, Germany. The decision to limit the machine to eight bars was made in view of the trend toward narrow widths. This vogue seldom calls for greater guide bar complement. Because of the relatively short swing on 8-bar operation, no nesting is resorted to. This permits keeping all bars fully leaded, dispensing with the time consuming procedure of fitting the pattern bars with guide "fingers" as required by design. The machine lends itself for quick pattern changeovers since the process of guide nesting and fitting is eliminated. The machine is available in 120 inch and gauges 26-44. Speeds up to 500 courses per minute are possible.

MARQUISETTE STYLE CURTAINS — The recent years had witnessed a phenomenal growth of Raschel curtain trade in Europe. Unfortunately for the domestic industry, there is no parallel development in this country. There are two basic types of Raschel curtains: (a) those made on special multi-bar equipment and (b) those made on jacquard type machines.

Multi-bar curtains are knit on marquisette ground involving

(*Continued on Page* 143)

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pillars and two opposing inlays on which the pattern effect is developed. Mayer recently introduced a high speed machine designed expressly for manufacture of such fabric, although it could be made on any suitable gauge lace model. The machine mounts three fully leaded ground bars supplied with yarn from 14-21 inch diameter beams and 5-10 pattern bars supplied from a creel. Owing to the small number of pattern threads used, it would be impractical to put them up on beams. Each thread has an individual tension device and runs from a cone containing enough yarn to last for many months of knitting.

Elimination of warping and downtime normally lost in replenishing of pattern beams contributes appreciably to production economics. The pattern mechanism is very similar to one found on lace machines. It features two chain drums, one for ground bars (two links per course), the other for pattern bars (one link per course). The limits of inlay shogs extend over 50 needles. The machine is available in width 100-240 inches and gauges 20-40. Performance is quoted 400-450 courses per minute.

The jacquard type curtains are made on an entirely different principle and equipment. There are only three fully threaded guide bars, one knitting pillar chains, the other two performing a standard marquisette inlay shog imparted to them from the chain drum. The guides on the back two bars are provided with a jacquard control capable of selecting any individual or group of guides. The non-selected guides knit the regular square mesh marquisette ground, while the selected ones lap over two adjacent pillars as to close up the mesh openings and so produce the pattern effect.

Selection of the guides is done either from conventional overhead jacquard acting via string harness or conveyor chain type jacquard extending full width of the machine and acting directly on the guides.

There are two jacquard curtain machines currently available on the market: The first is Liba-Textor built by Liba Maschienenfabrik at Naila, Germany. This is an outstanding

(*Continued on Page* 144)

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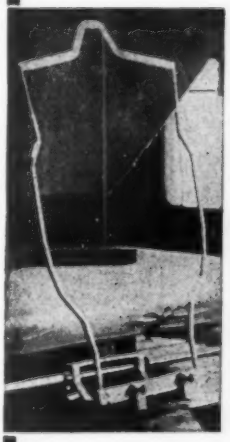

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machine incorporating many novel if not revolutionary features. It has a complement of three guide bars—one performing the pillar chaining movement, fully threaded and supplied from a regular beam, the other two also fully threaded but fed from creels located at the side of the machine. The rear guide bars executing an inlay movement for marquisette or hexagonal net have their guide blades slidably mounted and selected to high or low position by the overhead jacquard. Normally, the guides are in low position and lap over two needles so as to close up the open mesh squares. By lifting a selected guide to high position, the inlay shortens and reduces its lap from two needles to one. This causes the inlay thread to combine with the pillar and open up the holes.

It is possible to produce a full range of patterns by using only one inlay bar. The second bar, however, enables the development of shaded effects by utilizing a single inlay combined with inlay on inlay design areas. The machine builders claim ability to change patterns within 5-10 minutes simply by fitting a new set of cards on the jacquard attachment. The pattern width can extend up to 40". Since the machine is 125" wide, 3 x 40" curtain panels may be knit simultaneously. The gauges available are 13-19.5 needles/inch. Cruising speeds of 300-400 courses/inch are quoted. The objectionable aspect of this machine is its floor space requirement. With two creels, the entire unit requires 565 square ft.

The other machine is the IWS curtain machine built by Industriewerk Schauenstein, Schauenstein West Germany. Like the Liba model, the IWS machine constitutes a spectacular achievement in Raschel engineering. Although both make the same product, their construction and principles of operation are entirely different. The IWS utilizes self-acting bearded needles of the type employed on some crochet looms (no presser bar required). There is a fully threaded guide bar for the knitting of pillar chains and two, also fully threaded, inlay bars provided with slidably mounted

(*Continued on Page* 147)

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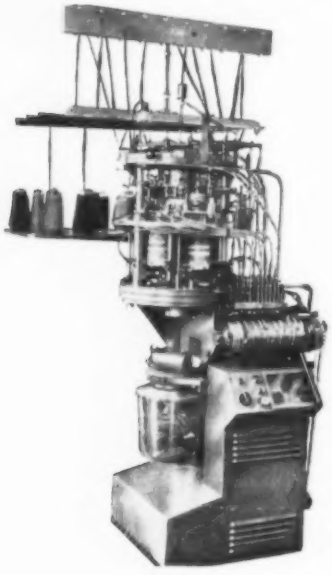

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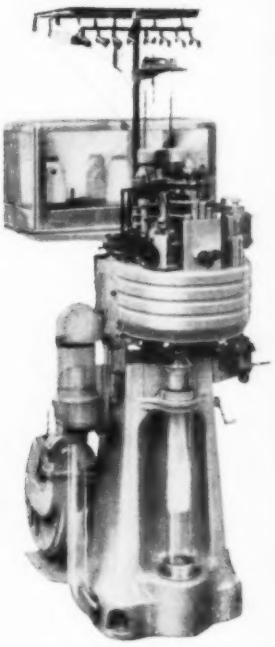

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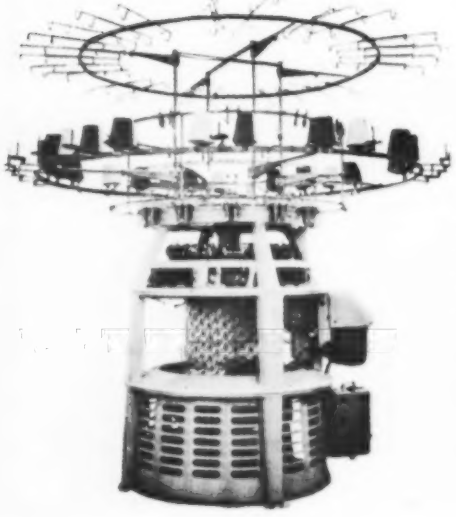

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feeder tubes instead of conventional guides, which draw their yarn from a creel. All bars receive shog movements from the chain drum or wheels. Working in conjunction with the inlay bars is a jacquard mechanism consisting essentially of light metal pattern rods extending the full width of the needle bar and acting directly on the guides. Each rod is fastened to a conveyor type chain which advances once per course as to present a new rod to the guide bars. The pattern rods are tricked according to given machine gauge. The tricks receive insertable bits as stipulated by the design. Tricks filled with bits will push the guides forward so that the yarn will be laid across two adjoining needles and fill the mesh opening. In the absence of bits, the guides will remain in their normal position and lay over one needle to produce an open marquisette.

The direct acting jacquard (see German Patent 1,094,914) is much simpler and more dependable than the complex overhead jacquard with its string harness and plurality of moving parts. The pattern may be set out to produce a curtain panel across the full width of the machine.

The IWS is available in 124 inch width and 8-12 needles per inch. The creel occupies about 360 sq. ft. Operational speeds on patterned marquisette are in the region of 200 courses per minute.

The jacquard equipped curtain Raschels despite their unlimited scope are not going to replace the multi-bar machines. The jacquard selection while affording complete freedom in creation of pattern effects in solid and open work areas, is restricted to one or two denier materials. Knitting of complex floral figures with heavy liners and shaded petal details executed in various deniers will remain the sole province of multi-bar machines.

ELASTIC FABRICS — From modest beginings a decade ago, warp knit elastic fabrics have mushroomed into big business and largely eliminated weaving from this lucrative field. There are two principal machine types used for manufacture of elastic

(*Continued on Page* 147)

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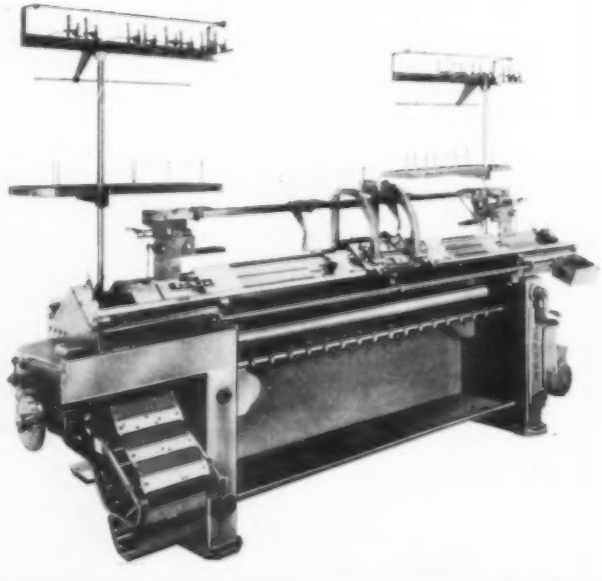

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cloth are: (a) four guide bar models for production of power nets and (b) multi-bar models for patterned power nets, laces, bands and other rubber bearing fabrics.

Four-bar power net machines are now built in U.S.A. by Kidde, in England by Hobley and in Germany by Mayer & Barfuss. All of them recently introduced new units capable of running at 700-900 courses per minute. They feature power driven let-offs, rigid, well supported guide bars, heavy frame and robust take up assembly. The needles are of special design to cope with the rigors of high speed rubber knitting.

Power net is a difficult and exacting material to produce. It requires precise feeding of rubber, uniform tension control and consistent take up pull. In these respects, there is less latitude with power nets than with laces, tulles or other articles. The machines are available in widths 100-200 inches and gauges up to 56, although 48 is now most common.

Typical of the multi-bar rubber knitting machines is Mayer's Super Elastic model mounting a complement of 12 bars. The guide bar assembly consists of fully leaded bars for knitting of the ground power net and 8 pattern bars carrying individual guide "fingers." Bars 1 & 2 carry nylon, rayon or cotton, while 11 & 12—rubber put up on 21 inch diameter beams. The ground and pattern bars are operated from individual chain drums. The machine is offered in 75-100 inch width and gauges 30-52. The performance figures quoted by Mayer are: for 4 bars —850 courses per minute for 12 bars—450 courses per minute.

CARPETING AND PILE FABRICS —The development of Raschel carpeting industry having passed a period of teething troubles is now proceeding at an accelerated pace. New carpet knitting equipment has been evolved both in the U.S. by Kidde and in Germany by Mayer. The two machines utilize a needle bar and a point bar around which the pile loops are formed. The single needle bar and oscillating hook system previously used by Lieberknecht has been abandoned.

(*Continued on Page* 151)

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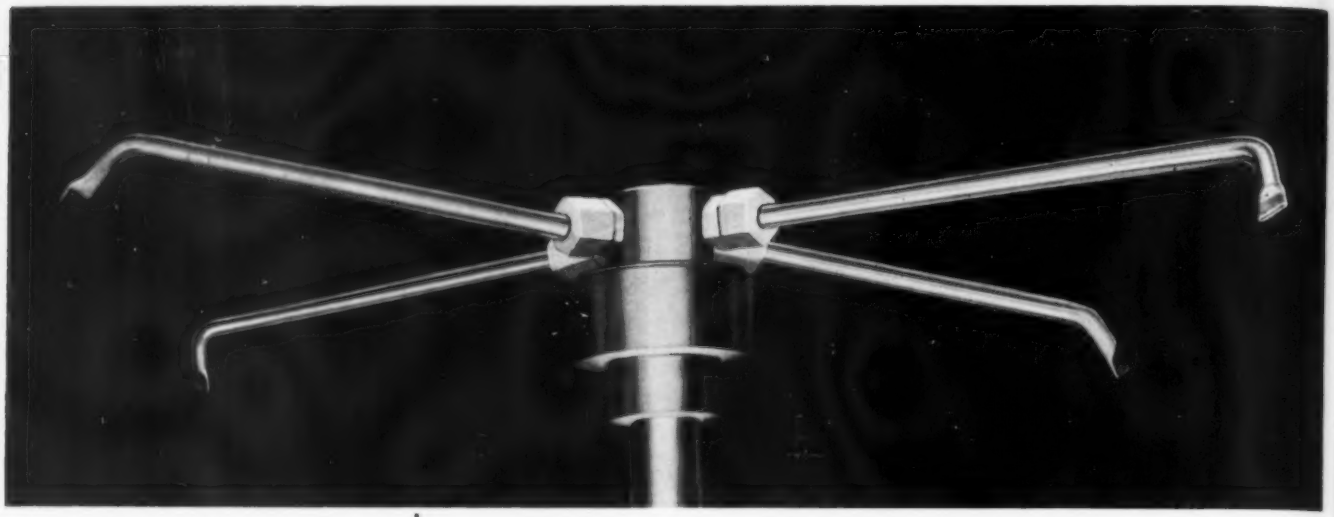

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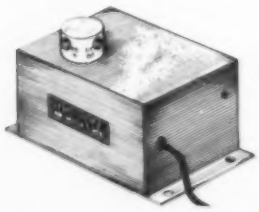

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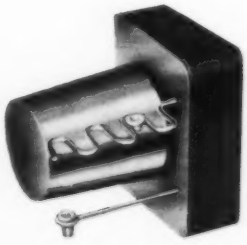

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More Mohair Produced In '60

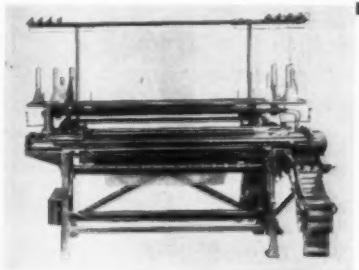
WASHINGTON, D. C. — Mohair production in the seven leading states in 1960 totaled 24,445,000 pounds, one per cent more than 1959 and 59 per cent greater than the 1949-58 average of 15.4 million, according to the U.S. Department of Agriculture. The U.S. is currently the principal producer of mohair. Texas, the leading mohair producing state, accounted for most of the increase. The increase is a result of the clipping of a larger number of goats as the average weight of hair per goat clipped was down slightly.

The number of goats and kids clipped in the seven states in 1960 was 3,884,000 head, three per cent more than 1959. The average weight of hair per goat clipped was 6.3 pounds compared with the record 6.4 pounds in 1959. Mohair production probably will be greater in 1961 because of the six per cent increase in the number of goats on farms and ranches in Texas on January 1, 1961 compared with a year earlier. As of January 1, 1961 there were 3,539,000 head of goats on farms and ranches in Texas compared with 3,339,000 head a year earlier.

Exports of mohair and other wool-like specialty hair from the United States in 1960 amounted to 13.5 million pounds, clean content, the second highest on record, but 27 per cent less than the record 18.6 million pounds exported in 1959. This was primarily due to reduced European demand and increased exports from the Union of South Africa. Exports increased during the fourth quarter of 1960, as domestic mohair prices were substantially lower than during the first half of 1960. During 1960 approximately 65 percent of these exports went to the United Kingdom. The Netherlands, Belgium, Japan, Italy and Canada accounted for most of the remainder.

Reflecting the decrease in exports and lower mill use, the average price received by grow-

(*Continued on Page* 155)



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ers for mohair for the marketing year April 1960 to March 1961 will be about 10 percent lower than the 96.5 cents per pound received in the 1959-60 marketing year. The 10-month (April 1960 through January 1961) average price received by growers was 87.7 cents per pound compared with 94.5 cents for the corresponding 10 months a year earlier. The average mid-month price in 1960 was higher than the same month a year earlier through June and less than the same month a year earlier after June. Mohair prices reached a high in April 1960. From April to September, the average price received by Texas farmers declined from $1.06 a pound to 72 cents. Since September, the average price has increased. In January and February the average price was 93 cents compared with $1.00 in February 1960.

Infants' & Children's

Coordinating Tops Lead In Boston

BOSTON, Mass. — Traffic was moderate at the United Boston summer showing of children's wear March 12-15, but representatives said the volume of bookings was high for this kind of show at this time of year.

A good deal of new styling appeared and lines were decorative and incorporated a number of new ideas. There was not much action in sweaters, but tops, blouses, polos, slip-ons and placket shirts to coordinate with shorts and pants moved well. Tank suits for sizes from toddlers to teen agers appeared to be a best seller. A number of manufacturers offered these swim suits with matching over-jackets.

Cotton tops and deck pants for sizes 3 to 7 and 8 to 18 were the most important group in the Pauker Boyswear selection according to Bert Rosnosky, representing the line in New England. One style top had a V neck made up of an inch and one-half band of white ribbing mounted on a body vertically striped with gold and black three-quarter inch wide, separated by a white stripe one inch wide. This also came in two tones of blue with white. Coordinating deck pants had a gold, white and black twisted cord waist tie with tassels fitted through belt loops and the same colors were used for a stripe down the sides of the leg and for edging on the two slash patch pockets on the side. A three inch vent appeared at the bottom of the leg. Similar sets were also made up with red and blue on white.

Another coordinated top had a boatneck and an all-over pattern of inch and one-half squares in two tones each of blue, gold, green and tan. These colors were also worked into the cloth belt with a metalic buckle on the deck pants.

Boucle shirts, 85 per cent cotton, 15 per cent nylon, were prominently featured in the Sargon Knitting Mills line. One style had a wedge placket with a one button fasten and the short sleeves were notched at the cuff and trimmed with one button. The outer edge of the spread collar was curved and the hip length body consisted of horizontal striping one inch wide in olive, white, black and gold. In a similar boatneck the striping was black, blue, green and white and also white, red, gold and navy.

Sargon also had shirts made with a chukker knit stitch with a split placket fastened at the top with two metallic stamped buttons held together by a chain. The shirt collar was rounded instead of coming to points and the notch cuff with a button trim was again used on the short sleeves. On a blue shirt the collar, placket and cuffs were edged with navy piping. In addition to chalk blue, this shirt was offered in basic shades of gold, clay and white with appropriate contrasting piping. A second style in this collection had a placket an inch and one-half wide in a Y shape with a one button fasten. This placket was striped in black, white and olive on a white shirt and also two tones of green and white on a stone mist shirt. The chest emblem was a gold and silver design on a black background.

Helanca and Lastex swim suits in sizes from toddlers to teens were selling particularly well in solid colors according to Done Lerner, Regal Knitwear. One favored selection is a Helanca tank suit made up in

(*Continued on Page* 157)

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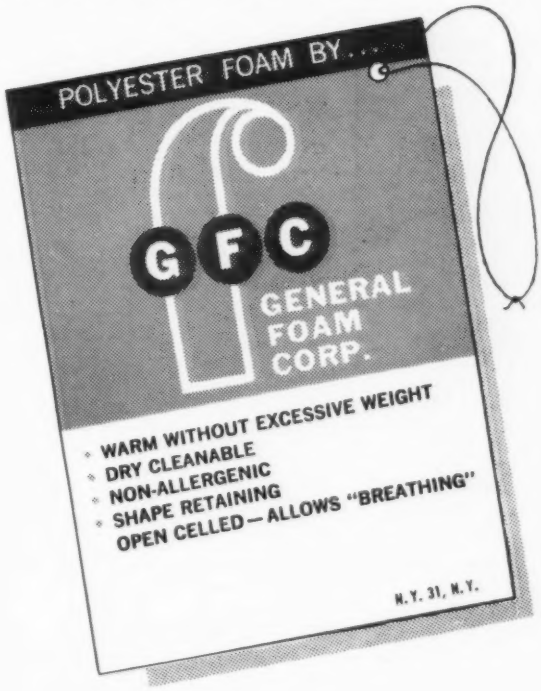

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vertical panels three inches wide. This suit had a high rounded neck, a deep, narrow and rounded opening in the back and brief elasticized legs. This came in solids of lilac, yellow, gold, red, loden, black, light blue and orange. Another popular style, in Lastex, was trimmed with three black buttons down the center of the bodice and on the right front, set below the waist. Black piping was used on either side of the center six inch panel and there was a string tie over the shoulders fastening to inside buttons at the back. This suit was offered in saffron, red, loden and navy.

Regal Knitwear also had a variety of styles in cotton polos. One made up in a corded fabric had round scallops on the hem and short sleeves. This was trimmed with a white welt, one-half inch wide on a body of orange ice, glo-green or spring lilac and was also made up in stripe and harlequin patterns.

Tunic Effect

Another Regal top had a tunic effect with a shirred elasticized waist, and boatneck. Colored piping was used on the neck and cuffs. The all-over fabric pattern consisted of one inch vertical stripe with broken block edging in tones of white, yellow and olive with orange. The same pattern was also offered in a lilac combination.

Elasticized cotton tank suits with over-jackets of terry cloth in sizes 2 to 3X and 4 to 6X caught the attention of buyers at the Glengyle Knitting Mills exhibit. The terry cloth jacket had elbow length sleeves and a crew neck. Four buttons were set on a button band about an inch wide which was lapped over and under for double strength. The matching tank suit worked in lilac or red on white had snowflake designs all-over, worked in jacquard and three-quarter inch edging in color was used at the top of the bodice and on the leg cuffs. The over-the-shoulder strips could be formed in a halter with a bow at the back or worn crossed. This tank suit was also made up in a fabric with an all-over jacquard pattern of broken black line figures and red pineapples conveying a Hawaiian touch.

(*Continued on Page* 159)

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Other top styles consisted of a terry cloth short sleeve, crew neck pullover with a screen print on the chest in royal or red on white. There was also a hooded, short sleeve top with a placket. As shown, this had vertical stripes about an inch and one-quarter wide in red and white or blue and white but these are to be converted to horizontal stripes, Al Wolff said. Stripes on the short sleeve cuffs and placket extend in a contrasting direction from those on the body of the sweater and give the effect of a check trim. A cord tie twisted in two colors with tassels was inserted in the hem so the garment could be worn bloused.

Overlapping boatnecks, sailor collars with wedge plackets, cuffed cowls and a variety of other necklines have been used for a wide selection of tops to coordinate with capri pants or jamaica shorts by Caper Knits. Cotton boucle has been used for a number of styles, one a sleeveless boatneck, striped horizontally in two tones of strawberry, canteloupe or banana in one-half inch bands separated by an inch of white. Color edges the arm opening and neck and on the inch and one-half lap on a mock pocket set low at the right. Color is also used on the border, set off-center on the left, on which there are four buttons. Another fabric pattern, used for a round neck pullover had a check pattern made up of three-quarter inch squares of white and two tones of green with a dark color separation between squares. This also came in combinations of corn and lilac. The collar opens at the back and has a one button fasten. One half inch of white edging is used on the neck, short sleeve cuffs and on the V hem.

Berkshire Sportswear had sleeveless, boatneck separates trimmed with a multi-color welt on the neck and arm opening. A cloth sewed-on belt, an inch and one-half wide, was set at the front on the boxy waist and was trimmed with three pearl buttons. The all-over body pattern consisted of one inch vertical stripes of orange ice and turquoise separated by a quarter inch of white. A second color combination for this style uti-

(*Continued on Page* 161)

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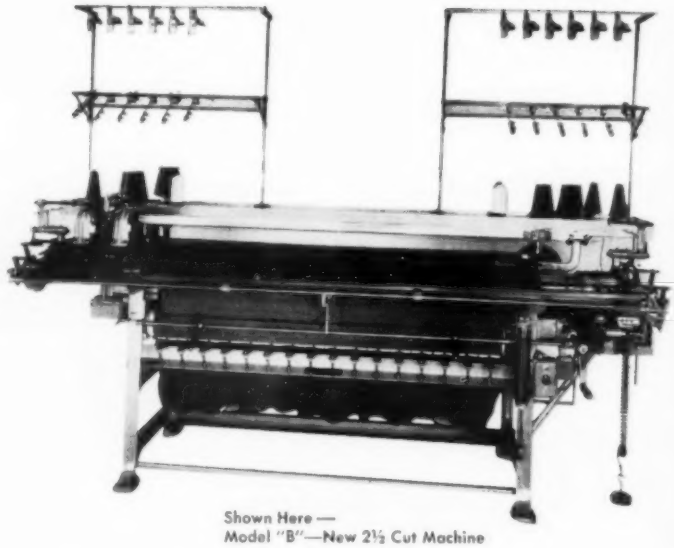

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lized lilac, white, orange and mist green.

Another slipon in this group had a close fitting boatneck folded in, two inches deep in front. The front and back were sewed across the shoulders and very brief sleeves were also sewed on. The body of the top was made up in corded cotton and came to a V at the hem. One half the garment was in lilac or butterball and the other half was white. This was decorated by three embroidered leafs down the center with white leafs extending in the color and colored leafs extending into the white.

Another sleeveless style in this selection had a white scalloped cuff sewed on the arm opening and as a yoke on the round neckline. These cuffs were trimmed with a double broken stripe and edging in color. Harold Levein, Berkshire line, said current sales have been fantastic for this style which is offered in basic shades of butterball or lilac with an embroidered chest emblem representing a lantern, suspended with black lines, with miniature dots of orange, red and green simulating lights.

Buffalo Summer Market Busy Despite Recession

BUFFALO, N. Y. — The summer market of the New York State Infants' & Children's Wear Association drew more retailers than last year. Most salesmen reported business as satisfactory, despite the recession in Western New York.

Two factors appeared to spur buying:

1. Pre-Easter retail trade has been moving with the help of favorable weather.

2. Most merchants are getting along on lower inventories and are in a strong open to buy position.

Many retailers who held off on summer purchases are starting to clamor for merchandise. Manufacturers are being hard pressed in some instances to meet delivery dates on summer goods.

There was good fill-in buying of infants' knitwear and swimwear for boys and girls in a broad age bracket.

Merchants bought fall sweater lines hesitantly, but there was high interest in knit sportswear and playwear for summer.

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NATIONAL KNITTED OUTERWEAR ASSOCIATION

Review Of Knitted Outerwear Activity During 1960

By SIDNEY S. KORZENIK
Executive Director & Counsel
National Knitted Outerwear Association

THE knitted outerwear industry in 1960 reacted under the influence of the recession and the industry's figures, when finally compiled, are expected to show some retreat from the peaks of 1959. Beginning in 1951 and continuing throughout the Fifties, the knitted outerwear and swimwear industry enjoyed an expansion that was maintained without interruption. Throughout this period, sweater shipments each year exceeded the total for the previous year, setting a series of new records. But in the year 1960, this unbroken upward curve dipped for the first time in ten years.

The story of the sweater industry's expansion since 1951 is succinctly told in these figures. The total production of sweaters of all kinds, men's, women's, children's and infants' was 7.7 million dozen in 1951. It climbed to 8.2 million in 1952; 8.9 in 1953; and 9.0 in the following year. Then a great leap to 10.1 in 1955; a still greater one to 11.8 in 1956; 13.5 in 1957; 13.8 in 1958; and 14.5 in 1959. Then last year in 1960 it suffered the first drop to a level which we estimate to be 14 million dozen. If our guess be correct, the total production achieved last year was still the second highest in history. It failed only when measured by the peak achieved in 1959. It was above the level of 1958.

Men's & Women's Sweaters

Most of the decline appears to have occurred in men's sweaters. Here the drop in shipments appears to have been approximately 7½ per cent. It is likely that production did not decline quite as much and that in consequence more substantial stocks than usual were left in manufacturers' hands toward the end of the year; and although some may have been liquidated in December, a quantity of last year's production closed out in the early months of this year.

Total Decline

In the case of women's sweaters, the production decline, according to our best estimates, was not as great, and for the industry as a whole may have amounted to about four per cent. Judging the production of children's and infants' sweaters to have been little changed from 1959, we would conclude that the total industry production declined by approximately one-half million dozen, or about three per cent. It would appear then that the total production of men's sweaters in 1960 was about 2.500 million dozen, as compared with 2.743 million dozen in 1959. We judge the production of women's sweaters to have been approximately 7.100 million dozen as against 7.334 in the preceding year.

Because the downward forces operating in the general economy were set in motion in the latter part of the year, their effect was particularly notable in sweaters, where the fall season represents most of the year's production. Other products of the industry whose season occurs earlier in the year were less seriously affected, as might have been expected.

Swim Suits and Knit Shirts

We anticipate that swim suit production was off by only a small margin, and this may be more properly accounted for by adverse weather conditions than by the drag of the recession. Estimates are difficult in this area, but we would judge the total women's swimwear production in 1960 to have been very little above 1,000,000 dozen, as compared to the official count of 1,149,000 dozen in 1959.

And as for the production of knitted shirts, which are chiefly a spring item, the total appears, according to present indications, to have made an advance over 1959. But this was probably not the result of the men's shirt business. Men's cotton shirt production was probably off by an amount which the increase in full-fashioned shirts of texturized nylon, great though it was, was not enough to compensate. What chiefly helped lift the total was the rise in the production of women's and children's knitted shirts. It is probable that knitted outerwear shirt manufacture rose in 1960 by as much as one-half million dozen, or approximately two per cent of 1959's annual total, reaching the total of approximately 22 million dozen. The effects of the decline in the general economy are more likely to be manifest in the figures for spring, 1961, than in the previous year.

Business Recessions and the Sweater Business

The recession of 1960 was the third to occur during the ten-year period of the industry's continuous expansion since 1951. In attempting to understand what happened in 1960, it is worth observing that the recession in 1954 did not prevent sweater production from achieving a new peak in that year. Nor did the set-back of the economy in 1958 deter the industry from setting a new record in that year. Yet in 1960,

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if our estimates are correct, the decline in total sweater production was about one-half million dozen, representing nearly three per cent.

Why, it may be asked, should adverse business conditions in the year past have checked the industry's expansion with so markedly different a result? Can it be said that the industry's capacity for expansion has been spent? We think not. We think it more likely that two other factors will account for what happened in 1960.

Timing Important

The first is the matter of timing, that is the phase of the industry's normal two-year cycle in which the drag of the recession made its impact upon the industry's operations. The onset of the 1958 recession began to be felt at the end of 1957 and its full effect in the early months of 1958. Now consider for a moment the industry's common two-year cycle and relate the two. Nineteen fifty-seven, as you may recall, was a year which started with a relatively high rate of activity and characteristically ended at a decelerated tempo, which as is normally the case carried over into the beginning of the ensuing twelve months. The beginning of 1958, dull phase of the normal cycle, was accentuated by the unfavorable forces at large in the general economy. But when the recovery movement got under way in the latter part of the year, it reenforced what would normally have been the upward phase of the industry's regular two-year cycle. As a result, the total record of the year was considerably improved by heavy shipments in the last quarter of 1958. This buoyant activity carried over into the beginning of 1959, when business continued in high gear during the early part of the year and then slowed down, as was to be expected, toward the close.

The year 1960 started at a slow rate as was also consistent, with the normal cycle, but the rise that should ordinarily have followed at the end of the year went unrealized: it was a casualty of the recession. In other words, the general business recession aborted the recovery phase of the industry's normal two-year cycle, with a consequently depressing effect upon the year's total. Whereas in 1958 the recession hit during the industry's normally dull period, in 1960 it killed off the industry's normally active rising phase.

Work Week Comparisons

It sheds some light on this analysis if we consult the figures on the average work week in the industry during each of these recession periods and compare what occurred at that time to the average work week in the industry throughout other years. With the exception of the years 1954, 1958 and 1960, the average work week in the industry usually hovered about 38 or 39 throughout the last decade. In the recession of 1954, however, it reached a low point of 35.3. In January of 1958 it was 35.1. But at the close of 1960 it dived to the lowest point reached since the close of World War II, namely 31.8; and in January of 1960 it was at the second lowest level of 35.0.

In summary, each of the low points in the hourly work week of the industry was reached in each of the three recession years of 1954, 1958 and 1960; and the lowest ebb of activity as reflected in average work week occurred at the close of 1960; and that the notably adverse effect on the total production in 1960 is due in part to the fact that the recession influences prevented realization of the upward phase of the industry's normal seasonal and cyclical pattern.

A second factor lies in the entry of a growing volume of low-priced foreign knitwear into the American market.

Import Problem in 1960

When we appeared before the United States Tariff Commission and the Committee for Reciprocity Information at hearings held last August, to oppose any possible tariff reductions that might be negotiated on the products of our industry at the GATT conference now being held in Geneva, we pointed out the crippling effect of imports upon the full-fashioned production industry in the United States and showed, on the basis of 1959 figures, that imports of wool sweaters and other wool knitted outerwear valued at over $5 per pound had reached in 1959—the last year for which complete figures were then available—a total of over two million pounds, with entry value at nearly $30 million. These figures then seemed large. They are. But the import statistics for 1960 show a poundage increase of over 60 per cent. Last year wool knitted outerwear valued over $5 per pound amounted to nearly 4,900,000 pounds, with total entry value of nearly $43.5 million.

The Japanese, who a few years ago had announced they would limit their exports of wool sweaters to the United States and Canada to 260,000 dozen per year, and who later retroactively revised the quota to some unspecified figure of about 290,000 dozen, shipped into the United States in 1960 a quantity of wool sweaters in excess of both these previously announced limits, namely — 353,322 dozen; and this total is based on official Japanese figures.

Japan Is First

Japanese shipments of wool sweaters valued at over $5 a pound reached 1.576 million pounds in 1960. Japan is the chief supplier of foreign wool sweaters to the American market. But the United Kingdom, which previously occupied first place and was second in 1959, ranked third in 1960 when Italian suppliers overtook the British. Sweater imports from Italy in 1960 amounted to 541,000 pounds, in contrast to Britain's 403,000.

What has been happening in this area is obvious. The concessions which our Government first negotiated in favor of Great Britain are now being utilized by low-wage producers in other countries; and it is not the United Kingdom which is the chief beneficiary — even her wages are now presumably too high—but, rather, the low-wage countries whose economies are reviving but whose wage scales are low compared to those even in Britain, to say nothing of our own.

It is also noteworthy that Italian exporters who in earlier years contributed limited quantities of great style interest and diversity proved a disturbing influence in 1960 not only in terms of volume, but in terms of price. As the market turned difficult in the latter part of the year, their opening prices, which were low enough to gain entry at the outset, were slashed by 20 per cent. The import figures show, for example, in the relationship between poundage and value, that in the first quarter of 1960 the average price of Italian sweaters coming into the United States was $10.12 per pound. In the last quarter, the average price per pound was $8.24. The same price decline affected Italian imports in the classification of wool knitted outerwear other than sweaters.

Maintain Price Level

The level of Japanese prices which are of course lower than Italian prices was maintained more evenly during the year by Japanese exporters. This was due in part to the fact that some price increases in Japanese fur blends took effect early in the year, demand being strong enough to warrant it. It also indicates the control over price exercised by Japanese Governmental licensing arrangements. But importers here reportedly closed out appreciable quantities when they dumped inventories toward the end of the year.

It is time, it seems to us, to recognize that quotas, if selectively applied, need not be viewed as repugnant to the general cause of liberalizing international trade. On the contrary, they may indeed be necessary in order to preserve it and enable it to survive in certain distinct areas. In the case of goods manufactured and exported to this country from notoriously low-wage countries, quotas are necessary in order to make possible free trade among nations with higher wage standards. Otherwise, commercial intercourse between countries with comparable social attitudes and labor standards may be disrupted by the entry of goods from areas where labor costs are drastically lower.

The analogy to interstate commerce is precise: Federal action in social legislation in the United

(*Continued on Next Page*)

States in a great many matters during the past quarter century, such as the minimum wage, unemployment insurance, and so on, has been repeatedly justified on the grounds that if such matters were left to the States, unfair competition would result between those adopting such measures and those that were less advanced. Recognizing in those cases how sensitive competition is to such relatively minor differences, how can relief be withheld where wage differences are so radical as those existing between the Japanese and the United States knitted outerwear industries?

We have reached the point where the liberalization of international trade between nations must be accommodated to some standards of fair competition. We arrived at this stage in our domestic system of free enterprise decades ago when we undertook to impose certain restraints on competition in the name of fair play. Our laws against unfair competition are of this character.

Need For Control

Since we cannot legislate for other nations, we ought at least put limits on the extent to which we will permit them to affect domestic conditions. They may not undermine the standards we have achieved through years of progress, by their flooding of our markets with goods made under conditions antagonistic to our own.

Since such relief is important for the safeguarding of our standards under present conditions, how much more essential is it when the domestic minimum wage is increased by 25 per cent as now appears imminent?

The time has come to adopt a policy of developing quotas on a limited number of high-labor-component articles such as sweaters coming from low-wage areas, and to achieve them by negotiation where possible and by our own unilateral action if negotiation fails. As to existing tariffs, they provide no effective limitation upon the volume of imports where low prices reflect low labor standards, and current duties on such goods coming from countries like Japan constitute a mere tax, without regulatory purpose or effect. In such cases, a quota would permit a country backward in wage standards to share our market without destroying it.

The volume of sweater imports toward the latter part of the year continued at relatively higher levels than did the shipment of domestic sweaters. In consequence, it was the importers who suffered as a result of the excess. They found themselves at the year-end with unusually heavy inventories.

Six Year Low

That is why entries of Japanese sweaters in January of this year were only 618 dozen, the lowest in six years. This also explains why news releases are emanating from official sources in Tokyo to the effect that a new and reduced sweater quota limit is being considered. Suggestions have been made that the present quota (which, incidentally, was never officially made public) will be cut back to something around 290,000 dozen per year.

All of this, of course, is largely trade propaganda. It is calculated to revive buying intreest by creating a sense of scarcity. The truth is, as the figures show, that the quota is maintained only if the trade applications for export licenses are less than the quota amount. Otherwise, the Japanese have shown no reluctance in issuing licenses for amounts in excess of the announced quota and have repeatedly done so.

Italy In Second Place

Two other developments are to be observed from the industry's import data of 1960: Italy not only achieved second place in wool sweaters valued over $5.00 per pound, but it made its greatest advance in the classification of wool outerwear over $5.00 per pound consisting of articles other than sweaters. Her total poundage in this category in 1960 reached 1.340 million pounds. The chief article in this category is knitted dresses.

Further, a fivefold increase occurred last year in the importation of wool knitted fabrics. The total quantity brought in from abroad in 1959 had been 118,000 pounds. In 1960, it grew to 464,000 pounds; and the value was up from $418,000 to $2,200,000. This increase was presumably sparked by the interest in double jersey fabrics from abroad and deserves close watching.

Growing Opposition to Imports from Low-Wage Areas

Opposition has been rising to a Government policy which encourages increasing quantities of goods from low-wage areas, and a common front has been developing among textile and apparel groups affected by this problem. The rise in unemployment, the decline of business activity, the continuing outflow of gold, the conspicuous injury to certain domestic groups—these are some of the factors which are bringing about a re-examination of our tariff policy. Industry feels frustration and disappointment over the possibilities of escape clause relief. Its protests are evoking wider sympathy. The battle lines on the tariff issue are changing. Not that the fundamental objectives of the Reciprocal Trade Agreement Policy are now being rejected. But there is a growing body of sentiment which is not essentially protectionist and which is not necessarily hostile to the broad aims of the Reciprocal Trade Agreement Policy but which nevertheless recognizes that the disturbing effects of imports from the Orient and other low-wage areas are a threat to the true fostering of international trade, and unless their damaging consequences are abated, the program can be vitally endangered with serious unnatural consequences.

Quantitative Limitations

There is also a growing realization that a tariff increase, even in the rare case where granted under the escape clause, is not an appropriate remedy for dealing with products that enter at shockingly low prices. For, the increase would have to be very great indeed to close the price gap—and so great a tariff rise, especially when made applicable to imports from all other nations, would raise duties well above Smoot-Hawley levels and would hardly be politically practicable. The proper remedy lies in quantitative limitations.

As for sweater imports in 1960, these rose approximately 1,200,000 pounds. Assuming imported sweaters valued over $5.00 per pound to weigh about 4½ pounds to the dozen, foreign producers contributed about 650,000 dozen to our domestic market last year.

General Business Outlook

Indications of renewed business activity are multiplying. Action in industry showrooms, though still below normal for this time of year, is also on the rise. But the element which chiefly characterizes the present situation is that production has been at so low a level since last fall that the likelihood is that there is going to be a shortage of sweaters for this year. And the same is probably true for most other products of the industry.

Consumer Purchases High

The reasons for this conclusion are apparent. They lie in the fact that consumer purchasing of knitwear has, according to all reports, been continuing at a good level, while manufacturing has been retarded for six months. The figures on the industry's work week are evidence of this. Retail buying policy in soft goods appears to have been intimidated by the effects of the recession on other fields of merchandise. Retail sales of the departments offering sweaters were slightly off according to the Federal Reserve figures, but their decline was far less than the sharp drop in sweater production. There will have to be some compensation for all this and for the hesitant buying up to the present. There is likelihood that buying will accelerate sharply and pressure for deliveries will grow intense as the season develops.

The basic forces that are responsible for the expansion of the industry during the past decade are surely still at work. Given a more favorable economic climate in which to operate and add to it the necessity for making up for lost production, there is reason to believe that the season will be late but excellent.

NKOA Convention

How To Engineer Knit Fabrics For Foam Lamination

By ROBERT G. EDDY
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LAMINATION of polyurethane foam to fabric is one of the outstanding developments to enter the textile market since the post-war family of synthetic fibers. The knitting industry quickly recognized the potential of lamination in the early phase of its development and knitters themselves have contributed heavily to the new lamination technology.

The merit of the laminated product was proven through the introduction of garments of knitted fabric which were amazingly light in weight without any sacrifice in warmth, body, resilience, or thickness. Furthermore, knitted fabrics found markets in areas where deficiencies such as; lack of dimensional stability, curling tendencies and cover prohibited their previous use.

Today lamination has become a most important "building block" for the designer and textile engineer. With increasing maturity the market has recognized that acceptable products can be arrived at only through the controlled blending of foam, fabric and lamination variables.

There are many forms of foam available on the market. It is polyurethane foam of the polyester type which we are primarily interested in for apparel purposes. These foams were originally developed as rubber substitutes in wartime Germany. When they were imported into the U. S. they were found to be deficient in quality and considerably over-priced for our markets. The current success of polyurethane foam is due in large part to the foresight of American foam producers who concentrated a large portion of their effort toward the development of foams engineered for lamination.

Foam Production

Basically, foam is produced by pumping the liquid resin components through two or more pumping units to a variable mixer. A reciprocating carriage nozzle assembly pours the liquid onto a walled conveyor belt. During the reaction process, as the material travels on a 150 foot belt, the liquid expands and solidifies into foam. A continuous process can produce up to 160 pounds of foam per minute or about 80 cubic feet. As the long slab moves on the belt an automatic saw cuts off a predetermined length. The foam slab has an outer skin which is then trimmed off to expose the porous inner structure.

Continuous Rolls

The foam buns are transformed into continuous rolls by one of the following three methods. The method resulting in the most uniform product with respect to thickness variation and length between seams is the outside diameter peeling process. This method can be likened to the peeling of an apple. A bun approximately 16 inches square by 60 inches long is pierced with a heated mandrel and rotated on its longitudinal axis while a blade peels a continuous 1/16 inch to ¼ inch section. The 3/32 inch thickness is the most popular for outerwear applications. The second method can be likened to the peeling of a donut from the inside out. The donut is formed by cementing the ends of a 120 foot slab together. This method is effective on ⅛ inch and thicker sections. The third and oldest method is horizontal slitting. In this process a slab 10 to 40 yards long is conveyed through a horizontal band saw and successive passes slice the slab. The number of yards between seams is short in this method and the trend is toward continuous peeling.

The marriage of foam to knitted fabrics is a natural since both parties contribute to bear the burden. Polyurethane foam can be formulated to result in a wide range of stress-strain properties. Although there are many foam trade names it is interesting to note that there are only four or five foam manufacturers and each produces a foam of distinctive characteristics. The selection of the proper foam for the particular fabric type and the desired end-use characteristics is an essential phase of laminate engineering. There is no one foam formulation which can be regarded as the ideal backing for every fabric type.

The slope of the foam stress-strain curve or its resistance to deformation is a prime consideration in heavy bulky garments. Likewise, the nature of the hysterisis loop or completeness of recovery from a given degree of deformation reflects upon shape retention or bagging at the elbows. The ratio of the area under the deformation curve to the area under the recovery curve indicates the ability of the foam to do the work of bringing the fabric back to shape and a low slope on the stress-strain curve lends itself to soft drape.

It is the new composite properties of the foam and fabric which can result in harmony or disharmony. Should the fabric have similar properties to the foam these will be additive. However, should either component have a greater resistance to deformation than the other, the two will not work together and will result in the shifting of the load to one component.

Variety of Characteristics

The surface textures also vary. This tactile property is an important consideration. Air permeability through the interconnecting cells of the foam has a bearing on the wearer comfort and insulating qualities. The density of the foam and the fineness of the cells determines the amount of insulation and dead air space as well as the contact area for good adherence to the fabric.

At present foam is sold in tan and charcoal colors. Dark colored fabrics are laminated to charcoal foam and lighter shades are laminated to tan to minimize contrast on open structures.

The chemists have learned how to control the various foam formulations to result in the desired properties. Many advances are forthcoming in the post treatment of foam to improve lubricity, sewability, elasticity and laminability.

The coming season will see the introduction of many new fabric types for lamination. All fabric types can be laminated to foam; however, off the shelf fabrics cannot be expected to attain the fullest benefits from lamination. The proper selection of fibers, yarns, spinning system, stitch structure and finishing procedure will produce results. Fiber type as regards morphology and cross section has a bearing on bondability. Smooth cylindrial fibers generally have less surface area and are more difficult to adhere to than are lobal or undercut and scaled surfaces. Filament yarns are also more difficult to bond to than are spun yarns. Textured yarns and brushed surfaces improve bondability. Finer denier per filament provides for more bondable fiber surface in a given yarn bundle. Lofty yarns of higher fiber crimp and lower twist factor also provide for more bondable surface than do hard, smooth spun yarns. However, it should be remembered that laminated knit fabrics are expected to be standins for durable traditional outershell fabrics. Therefore, conformity to recommended blend levels and twist factors is of prime importance. Fabrics intended for lamination should be engineered for hard useage.

The nature of the jersey loops to rob yarn from one another when stress is applied in the course direction is greater than when stress is applied in the wale direction and the loops are forced to elongate. This property is magnified in rib base structures where additional extensibility in the course direction comes from the peculiar crimp resulting from drawing opposing loops. These directional properties are balanced to an extent by a controlled and proper form of lamination. However, should each yarn bundle be locked to the foam with an adhesive the laminated product will be stiff and boardy. Also, feeding of the fabric to the point of lamination in an unrelaxed state will unbalance the structure.

There are two forms of lamination. The first method was

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the adhesive bonding process. This method was employed and abandoned in the early fifties. The second and most ideal bonding method utilizes the molten foam itself as the adhesive. Polyurethane of the polyester type exhibits excellent resistance to dry cleaning and laundering. During the lamination process the surface cells of the foam are exposed to controlled heat. These heated and tacky foam cells are pressed to the fabric. The cured bond has the same properties as the foam. The foam and the bond, when applied to a knitted fabric, work in unison. Since the bond is formed from a cellular deposition of the foam, the points of contact with the fabric are discontinuous and allow the yarns to move to provide for drape. The number of bond sites per square inch is dependent on the density of the foam. In the lamination process approximately 1/32 inch of foam thickness is fused to the fabric.

Fabrics intended for lamination should be scoured and free from finishes which prevent or reduce the bond strength. Spinning oils, waxes and sizes should be removed. Softeners and water repellants which are traditionally applied after dyeing have negative effect on bond strength and it is recommended that these finishes be applied after lamination.

The markets to be reached through the lamination of knitted fabrics have barely been scratched. Many new products and ever improving quality are available to the knitting industry and the laminator alike through the cooperative development of fabrics specifically engineered for lamination.

NKOA Convention

Finishing Of Knit Cloth For Laminating With Foam

By HERMAN B. GOLDSTEIN
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POLYURETHANE is a type of plastic material which is prepared by the reaction of a diisocyanate with a compound containing two or more hydroxyl groups in the presence of a suitable catalyst; for example, by the reaction of toluene diisocyanate with polyethylene glycol. By the proper selection of the starting material and by varying the ratios of the chemicals used, polyurethanes may be obtained which have a wide range of physical properties; that is, from very stiff, brittle polymers to very soft rubbery compounds.

As compared to ordinary rubber, however, polyurethane has some unique properties which make it distinctly superior for special applications. For example, polyurethane is essentially unaffected by oxygen or ozone, and thus, retains its strength and flexibility over long periods of storage and use. Further, polyurethane is insoluble and does not swell in ordinary solvents, and therefore, it can be subjected to dry cleaning without adverse effects. Polyurethane is also well suited to foaming processes. Through the use of foaming techniques with the soft, rubbery types of polyurethane, it is possible to obtain extremely porous, lightweight masses of the plastic. If such foamed polyurethane is made into thin sheets it resembles or complements textiles in hand, drape, and insulating qualities. When a thin layer of foamed, flexible polyurethane is laminated to knitted or woven textiles, the resulting composite structure displays certain functional and aesthetic properties which are not obtainable with either the polyurethane or the textile separately. Such laminates have extraordinary bulk and insulating value with low weight; they have extremely low air permeability, but do permit the passage of moisture vapor, and they have excellent full hand and draping characteristics. In addition, the polyurethane backing helps to lock the stitch or the weave, and thus reduces laddering and edge fraying of the fabric.

Although woven fabrics are used to some extent for lamination with polyurethane, the major part of this type of work now involves the use of knitted fabrics. There is good reason for this because knitted fabrics have certain intrinsic properties which make them well suited for such work. On the other hand, knitted fabrics present certain difficulties which must be overcome in order to produce laminates of satisfactory quality. The widespread public acceptance of garments containing polyurethane-knit laminates is a praiseworthy testimony to the collective persistence and ingenuity of all segments of the trade involved with this work, and clearly indicates that these difficulties can be overcome satisfactorily. Some previous papers which have dealt with this subject are listed in the references (5, 6, 7, 8).

At the present time, most of the polyurethane foam which is used in this lamination work is produced by a few specialty manufacturers. These concerns mix the necessary chemical ingredients together with the foaming agents (which are sometimes called "blowing agents"), and then convert it into the long strip of foamed polyurethane. The strip can be formed in various thicknesses and in the standard textile widths, and is usually supplied in lengths of 200-300 yards. These lengths of polyurethane foam are then rolled up, and are shipped to the laminators.

The polyurethane foam can be supplied in its natural color which is just off-white, or pigments or dyes can be incorporated, yielding polyurethane foam of various shades.

At present, a large bulk of the laminating work is done by commission laminators. However, there is a growing trend for dyers and finishers to undertake the laminating operation themselves. In the case of the commission laminator, it was, until recently, almost universally practiced that the textile to be used was previously dyed and finished according to the specified requirements for the final product before the laminate was formed. However, there is now a rapidly growing practice with both commission laminators and vertical set-ups to laminate the dyed fabric before it is given a finish. Then the laminate is finished as required. There are some advantages and disadvantages with each technique, depending to some extent, on the nature of the fabric, as well as the finish which is to be applied.

As to the lamination operation itself, the textile which is to be laminated and the urethane foam are fed, simultaneously, into a heating zone where the inner face of the textile and of the polyurethane foam are heated. Sufficient heat is applied to the urethane foam to cause incipient melting. Immediately on exiting the heating zone, the fabric and polyurethane foam are brought together and they are usually calendered to form the bond. The method for heating and the actual mechanical details of handling are usually very closely guarded secrets of each individual laminator. However, it is well known that the use of gas flames for this heating is rather widespread. To a lesser extent, high frequency diathermy may also be in use.

Advantages of Heat Bonding

Early experiments to form this bond involved the use of adhesives, but adhesives are now largely replaced by the technique of heat bonding. Adhesives have been found generally objectionable because they interfere with proper breathing of the fabric, add stiffness, and lose their bond strength when the laminate is laundered or dry cleaned.

Before leaving this topic of the lamination, it may interest you to know that there is an alternate technique to produce these polyurethane backed textiles which does not involve a lamination operation. This technique, which is under intensive study in the United States as well as in certain foreign countries, involves generating the polyurethane foam at the time it is to be applied to the fabric, to apply the foam while it is

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still in a fluid condition, and then to "cure" it on the cloth. Application can be done by a sort of a back-coating technique, or by extruding the foamed polyurethane onto the moving fabric. Needless to say, this type of operation requires the closest of controls in preparing the foam, and in application to the fabric so that the foam will have the proper density, thickness, and uniformity. As the volume of polyurethane-textile laminates come into wider use, however, it seems likely that this technique will be adopted,—at least by the larger, vertical companies.

Chemical Finishing

It is obvious that the textile must be receptive to the molten polyurethane if a strong, permanent bond is to be formed. Thus, any chemicals which are used in the finishing of the textile, prior to laminating, must be carefully selected to be sure that they will not cause any impairment of the bond strength. And in this regard, it is important to note that some chemicals which have been used for finishing the textile seemed to have no adverse effect on the bond strength when the laminate was first prepared, but, unfortunately, in some cases this weakening of the laminate bond became apparent only after the goods had been in storage for several months. Thus, in the selection of finishing agents for the fabrics to be laminated, experience is the best guide.

As stated earlier, the knitted fabric structure has certain definite advantages over woven fabrics for this lamination work. One of the most important characteristics of knitted textiles lies in the deformability of the fabric. When under control, this deformability contributes to body hugging characteristics, better drape, and it lends itself to contouring in the styling of a garment.

However, this very deformability of the fabric, when excessive, can also lead to problems; it can lead to problems for the laminator, and it can lead to problems for the consumer. Specifically, excessive deformability of knitted fabrics permits the fabric to be readily stretched with only slight tensions; this makes it difficult for the laminator to feed the fabric uniformly to the laminating machine, and under severe conditions, leads to rippled or buckled effects, and may leave the laminated fabric with excessive or non-uniform shrinkage potential. On the other hand, such uncontrolled fabrics can easily shrink 15 to 25 per cent when laundered, and a laminate made from such a fabric may show severe buckling, distortion, or even rupture of the laminate bond, when laundered.

Improving Dimensional Stability

Through the use of appropriate thermosetting stabilizing agents, the dimensional stability of knitted fabrics can be improved to the point where they will not stretch excessively during processing, nor will they shrink excessively during use or laundering, while at the same time, sufficient "snap" will be left in the fabric to take advantage of the characteristic resiliency of the knitted structure. Thus, fabric stabilization is one of the most important functional effects which can be obtained on knitted textiles through chemical finishing. This is of particular importance with fabrics knitted from cotton or rayon. I list below a few typical treatments which are in widespread use. All percentages given are on weight of bath, except where indicated otherwise:

1. Dimensional stabilization of cotton knits:
   15% Permafresh Resin
   2.0% Mykon Softener
   5% Catalyst-Weighter
   pad, dry cure.

2. Dimensional stabilization of cotton knits with 4-5% weight add-on:
   25% Resin-Weighter Combination (Self-Catalyzing)
   2% Mykon Softener
   pad, dry, cure.

3. For cotton knits, dyed with reactive type dyes; dimensional stabilization with unimpaired lightfastness:
   10% Permafresh LF
   2% Mykon SF
   2% Catalyst X-4
   pad, dry, cure.

Water Repellency is another very important functional effect which may be obtained through chemical finishing. Our water repellents also impart resistance toward water borne spots and stains. Some widely used formulae are:

4. Water repellent and spot and stain resistance on all-wool-en knit:
   3% Norane W-1
   5% Norane W-2
   Pad, dry.

5. Water repellent and spot and stain resistance on 80/20 Orlon-wool knit:
   8% Norane 195
   Pad, dry.

6. Water repellent and spot and stain resistance on cotton knits:
   8% Norane C
   1.5% Mykon NRW
   1.0% Catalyst K Conc.
   Pad, dry, cure.

It is frequently desirable to impart fabric stabilization and water repellency simultaneously. This can be done by properly combining certain finishing agents as shown below:

7. Dimensional stabilization, water repellency and spot and stain resistance on cotton knits:
   15% Permafresh 197
   8% Norane C
   1.5% Mykon NRW
   0.2% Acetic Acid
   1.5% Catalyst X-9
   Pad, dry, cure.

All of the preceding formulations are based on impregnating dry fabric in a pad. It is outside the scope of this paper to go into any details concerning the special precautions which should be taken during padding, drying and curing of tubular knit goods; however, such details and recommendations for proper handling have been described in considerable detail in previous papers by the author (2, 3, 4).

Many fabrics can also be finished wet, but impregnated wet fabric requires considerably more control, and invariably requires the use of higher concentrations of impregnation bath. For example, with an Orlon /Wool (80/20) blend, impregnated wet, we suggest a 15 per cent solution of Norane 195.

Exhaustion Application

Most of the thermosetting resins and catalysts are not substantive to textiles, and therefore, cannot be applied by exhaustion. However, some of our water repellent treatments are substantive, and can be applied by exhaustion when the mill set-up is favorable for an exhaustion application. For example, a formula which is in widespread use for exhaustion application is given below:

8. Water repellency and spot and stain resistance on all-wool and Orlon-wool blends:
   8% Norane 195
   Exhaust, dry.

In Formula 8 the percentage is based on the dry weight of fabric to be processed. Prior to addition of the water repellent, the fabrics are dyed in the usual manner, and then are very thoroughly rinsed to remove all loose dyestuffs, surface active agents and leveling agents. The machine is then refilled with fresh water at 120°F., and one per cent of acetic acid on the weight of goods is added. The required amount of Norane 195 is diluted with 2 to 3 times its weight of cold water, and the diluted solution is added across the width of the machine while running. Exhaustion will generally be completed in 30 minutes. The rate of exhaustion can be increased by adding another percent of acetic acid or by raising the temperature, or both. After exhaustion is completed, it is sometimes desirable to give the fabric a gentle, overflowing rinse, with the machine running.

Applying Water Repellent

While on the subject of water repellency, I wish to emphasize that a number of advantages may be obtained if the water repellent is applied to the cloth-urethane laminate rather than to the face-fabric prior to laminating. First of all, if the water repellent treatment is applied after the laminate bond has been formed, the water repellent chemicals cannot cause weakening of the bond, and this permits a wider selection of chemicals which may be used. Thus, for example, silicone water repellents must not be used on the face fabric before laminating because silicones interfere with the bond; on the other hand silicones may be applied to the pre-laminated structure to yield excellent properties. The use of silicone type water repellent, applied in this way, is preferred over other types of water repellents because silicone imparts water repellency of excellent durability to laundering and dry cleaning, it provides the face fabric with an excellent hand and texture, and it provides lubricity to the urethane foam

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which greatly improves the sewing characteristics of the laminate. Another advantage of applying the water repellent to the laminate is the fact that the entire structure is thereby water repellent, resulting in vastly improved performance. A typical formula for this type of application is given below:

9. Silicone water repellent treatment on laminate:

8% Norane Silicone
Catalyst
Pad, dry, cure.

Conclusions

In the short period of its use, foamed polyurethane laminate is already being offered in men's coats, raincoats and jackets, women's raincoats, suits, and car coats, and children's snowsuits and sleep wear as well as miscellaneous sporting apparel such as ski suits and sailing clothing.

Wherever warmth is a functional factor required in a garment, the use of polyurethane has revolutionized the concepts in fabric selection and in fashion ideas. The use of these laminates has literally opened entirely new horizons of design and styling. Designers are now free to use certain fabrics which were not even considered as outerwear possibilities. For example, certain lightweight knits, sweaters, and many other fabric variations. The designers have picked up these possibilities as are evident from the latest offerings, and the tremendous response of the consumer at the retail level has been nothing short of fantastic. As an indication, a recent survey (1) has shown that about five million yards of polyurethane foam were consumed by the clothing industry in 1960; it is estimated that 12.5 million yards will be consumed in 1961, and about 35 million yards will be consumed by 1965.

The concerted and cooperative efforts of the dyeing and finishing mills, the laminators, and the chemical manufacturers will certainly lead to even finer results with ever increasing consumer acceptance, and yielding benefit to all concerned.

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NKOA Convention

Fibers, Yarns And Machinery For Double Jersey Cloth

By JAMES H. BLORE
Director of Fabric Development
Maldon Knitting Mills

DOUBLE jersey fabrics are big news today and their growth over the last two years has been steadily increasing. The latest developments in double jersey can be divided into three groups: (1) new machines; (2) new fibers and yarns; and (3) new fabrics.

New Machines

New machines are being introduced at a rapid rate and most machine builders are ready to show brand new models at the Knitting Arts Exhibition at Atlantic City. Domestic machines are divided into those units which are manufactured primarily for the knitting of double pique fabrics and other fabrics that contain no pattern features, and machines that are capable of producing a large variety of plain and patterned goods.

There is a distinct trend towards a larger number of feeds. The new Philip Machine, for instance, has 48 feeds. The cylinder size of this machine is 33 inches — the largest size built, and it is made in cuts up to 18 needles per inch.

A patented trick wheel system on this machine works in conjunction with pattern wheels and this system allows the production of patterns with no spiral. The dial has long and short needles and the cylinder is equipped with high butt needles with short tails and low butt needles with long tails, so the pattern wheels are not necessary to knit double pique and other plain fabrics. A dogless drive is also featured to eliminate dog marks.

The Supreme IRW/2 is also a multi-purpose high-production machine with 36 feeds, each equipped with six inch or larger pattern wheels. The dial has a dual raceway and either raceway can be set to the knit and tuck or knit and welt position. Feed rolls to assist in feeding and controlling rubber yarns for swim suit fabrics are available. This machine is built with 30-inch diameter cylinders in up to 16 needles per inch. Production rates of 42 yards per hour are claimed.

The Wildman-Jacquard PBP-44 is not fitted with pattern wheels, but many different fabrics can be knitted by rearranging the needles and cams on the cylinder and dial. The dial and cylinder are equipped with long and short needles and the dial cam sections are interchangeable.

Built-In Lubrication System

A furnishing wheel system consisting of a double set of fluted rolls helps to feed the yarn at a constant rate and improve the quality of the cloth. This machine also has a built-in lubrication system and air pressure system for removing lint. Production of double pique fabric is clocked at 20 lbs. per hour.

The new Scott William machine in cuts up to 18 needles per inch, and it has a stationary cylinder which is claimed to make it ideal for knitting fine double pique fabrics. The stationary cylinder also provides a dial drive which is less complicated than rotating cylinder types. The cylinder and dial has been designed to hold the needles in their correct postion for high quality fabrics.

There are 32 feeds on the 30-inch cylinder and the machine operates at 23 r.p.m. The take-up rolls are covered with a ¼-inch thick synthetic rubber sleeve to provide a good grip on the fabric and yet do no damage to the fabric.

New machines from abroad largely consist of multi-purpose machines with pattern wheels, pattern drums, or other needle-selecting mechanism that operates on the cylinder needles. Many of these machines are equipped with variable-speed motor drives, tension-control units for elastic yarns, yarn furnishing devices, easily adjusted stitch cams, and easy methods of changing the selection of jacks in the pattern wheels.

Double jersey machines demand good quality yarns in fine counts to produce best results. Some spinners are now specializing in these yarns. Worsted yarns are still the principal materials knitted on double jersey machines, with the double pique stitch the most popular construction.

Yarn counts are fairly standardized at 1/24s to 1/26s worsted count for 16-cut machines, 1/34s or 1/36s for 18-cut machines and 1/40s for 20-cut machines. Stock-dyed yarns seem to give the best results, although most yarn is package dyed.

Cotton yarns are being used on double jersey machines for summerweight dresswear fabrics. Yarn sizes range from 20/1 to 26/1 for 18-cut machines and double pique and blister stitch fabrics are knitted.

New Fibers And Yarns

Exciting news in double jersey has been the introduction of man-made fibers into many double jersey fabrics. Most yarns spun from man-made fabrics are ideal for knitting double jersey fabrics.

Yarns spun from these fibers increase the fabric possibilities enormously. In many cases, the man-made fiber will knit with less difficulty than its natural counterpart.

Many fabrics can be produced by simply switching from the natural fiber to a man-made fiber with no change in stitch or yarn count. In many cases, the properties of the man-made

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fiber are used advantageously to impart some additional qualities to the fabric.

Acrylic yarns and blends supply double jersey fabrics with excellent wash-wear properties. Textured filament yarns provide smooth lightweight fabrics for dresswear, and elastomers are knitted into the fabric to build good elasticity with little increase in weight. Opportunities are seen for the use of high-shrink or high-bulk acrylics to improve the dimensional stability of the fabrics for coatings.

Orlon, Acrilan, and Creslan yarns are usually knitted in a double pique stitch. Both Swiss and French constructions are used. Swiss double pique, made by knitting on all cylinder needles at odd feeds while odd dial needles knit at Feed No. 1 and 2 and even dial needles knit at Feed No. 3 and 4, is acknowledged to provide a more dimensionally stable fabric than French double pique.

French double pique, however, finishes with a wider width than the Swiss method and this extra width can be useful in obtaining wash-and-wear fabrics of commercially accepted widths. French double pique is produced by knitting on all cylinder needles at even feeds and by knitting on the odd dial needles at No. 1 and 2 feeds and even dial needles at No. 3 and 4 feeds.

Most acrylic fibers are knitted in the 100 per cent form, but blends of the acrylic fiber with cotton or wool are also finding favor among knitters. These yarns containing all-acrylic fibers are spun from 4.5-denier fibers or 3-denier fibers. Various blends of these fibers are also used. The 3-denier fibers contribute softness and cover while the 4.5 denier fibers add a crisp wool-like hand to the fabric.

Acrylic fibers for double jersey are usually all regular or low-shrinkage fibers in the 100 per cent blends. High-shrinkage fibers are not generally employed to give additional cover and stability because the count must be about 20 per cent finer in order to keep the fabric at a reasonable weight for dresswear, and finer counts are more difficult to spin and consequently more expensive.

Counts that are used in regular shrinkage yarns range from 1/24s for 16-cut machines to 1/36s used on 20-cut machines. 1/30s to 1/34s are used on 18-cut machines. These counts are slightly heavier than those used for worsted yarns.

Cotton-spun yarns ranging from 20/1 to 24/1 are knitted on 18-cut machines. These yarns are more economical than yarns spun on the worsted system and give quite good results. Acrylic yarns processed on the Turbo system offer yarns with better loft and hand. Because no high-shrinkage fibers are involved, yarns spun on the Pacific Converter system can also be used to knit double jersey fabrics.

Package-dyed yarns knit into fabrics with a well-defined pique appearance and a firm hand, and even better results are obtained from tow-dyed yarns. Some yarns are knitted in the greige and the fabric is consequently piece dyed in the beck. The resultant hand of the piece-dyed fabrics is softer than the fabric knitted from package- or tow-dyed yarns. However, the fabric becomes more limp and less wool-like after piece dyeing.

Both piece-dyed and package-dyed acrylic yarns that are knitted into double pique fabric finish about the same weight as wool fabrics, which range from 12 to 15 ozs. in 60 to 64 inch widths. Courses per inch range from 32 courses to 40 courses with 1/34s or 1/36s yarn.

Yarns containing 100 per cent acrylic fibers generally knit better than wool yarns, although acrylic-cotton blends present more difficulty than 100 per cent acrylic yarns. The percentage of cotton is usually maintained at the 20 per cent level to preserve the wash-wear properties of the acrylic fiber. Regular shrinkage fibers of 3 or 4.5 denier form the man-made fiber content of the blend.

Acrylic-wool blends knit with little trouble. The acrylic content here may be a 3-denier relaxed or 4.5-denier relaxed fiber, and the wool is 64s quality. Regular jersey yarns of 80/20 Orlon/wool, which contain 40 per cent 3 denier high-shrinkage fibers, 40 per cent 2 denier regular-shrinkage fibers and 20 per cent 64s wool have been known to give good results.

Although regular shrinkage acrylic fibers impart good stability to the cloth the possibility of using a high-bulk or high-shrinkage acrylic fiber at the feeds that knit the dial needles only is interesting. When this fabric is piece dyed, the welt stitches shrink and prevent the stitches knitted on the dial and cylinder needles from stretching.

Double pique fabrics are also being knitted from textured filament yarns. Chief among these are Ban-Lon, Orlon Cantrece, Agilon and stretch nylon yarns. Yarn sizes that are mostly used are 70/2 denier and 100/2 denier. These yarns are generally knitted in the greige and piece-dyed, although recent developments in package dyeing these yarns allows colored fabrics to be produced on the knitting machine.

Interesting effects are produced by threading the feeds that knit the dial needles only with one color while the feeds that knit the dial and cylinder are threaded with a second color. The result is a fabric with one face a solid color and the other face a mixture of the two colors.

The chief trouble encountered in running textured filament yarns is barré in the fabric. This problem is being minimized to a certain extent by the use of a yarn speed meter after each feed has been checked with a tension meter. Yarn speed meters are also useful in determining the correct 2:1 ratio of the dial and cylinder feeds to dial feeds in all double pique fabrics.

The new elastomers, Vyrene and Lycra are providing exciting new fabrics for swimwear. With the correct yarns and knitting procedures, there is no reason why these fabrics cannot also be used for foundation garments. So far, uncovered elastomers have not been knitted successfully, and the covered varieties are extremely costly. However, because these yarns are so light in weight the perecentage of elastomer in the fabric is held to a minimum, and the cost is not much greater than if rubber yarns had been used.

Double pique fabrics again provide the base for most swimwear fabrics although the interlock stitch is sometimes used as a base. The dial and cylinder feeds and certain dial feeds are threaded with stretch nylon, Ban-Lon, wool or an acrylic yarn, while certain dial feeds are threaded with an elastomer, depending on the amount of elasticity required.

New Fabrics

By European standards, double jersey fabrics are not new, but more and more stitches other than double pique are making their appearance in domestic mills. Among these are two- and three-color blister stitch fabrics; two-, three-, and four-color jacquard fabrics; plain blister stitch fabrics and pleated double pique fabrics.

Two-, three-, or four-color jacquard designs are knitted on machines equipped with pattern wheels, pattern drums, jacquard cards, or other needle-selecting mechanism. Bird's eye backing is generally used on these designs to impart rigidity, to save yarn and weight, and to create a smooth back. The odd dial needles at Feed No. 1 knit one color while the even dial needles at the next feed knit the second color.

Another variation of bird's eye backing is based on the double pique stitch where the odd dial needles on Feed No. 1 and No. 2 are set to knit, and the even dial needles knit on Feeds No. 3 and 4.

Yarns used on jacquard fabrics are cotton, worsted, Orlon, Ban-Lon, and stretch nylon. Possibilities exist here for the new cross-dyeable acrylics—Acrilan 16 and Orlon Type 44. Two-color effects can be obtained by knitting the Acrilan and Acrilan 16 or Orlon Type T42 and Type T44 yarn in the greige and obtaining the colored effect in the dye bath. Solution-dyed black Orlon or Acrilan can be used as the third color for the three-color effects. Nylon 6, nylon 66, solution-dyed black nylon and Dacron can be used to create four-color effects in stretch fabrics by the piece-dye method.

Single color blister stitch fabrics are produced on jacquard-type machines by using the needle selecting mechanism at each feed to select certain cylinder needles to knit while the remain-

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ing needles are retained in the welt position. All dial needles are set to knit at all feeds. These fabrics are usually constructed of wool because the resilience of the worsted yarn helps the blister portion to stand out more prominently. Worsted counts of 1/34s to 1/36s are necessary on 18-cut machines to knit these fabrics, and these yarns are not easy to knit because of the long welt stitches. An addition of 10 per cent nylon staple to the fiber blend helps to prevent the formation of holes during knitting.

A blister-type stitch with good possibilities for suitings is formed by knitting on the dial needles only at odd feeds and knitting on the cylinder and dial needles at even feeds. This forms a welt stitch and creates a stable fabric when knitted tightly with wool at all feeds or with a high-bulk acrylic at odd feeds and wool at even feeds.

Blister-stitch designs incorporating three colors are made for swim suit fabrics. The first feed knits the ground color on odd dial needles and selected cylinder needles. The second ground color knits on even dial needles and selected cylinder needles. The third color fed at the third and fourth feeds knits cylinder needles only. These cylinder needles are the ones that were not selected at Feeds No. 1 and 2.

Pleated fabrics are usually made from worsted yarns in the double pique stitch. Pleats are formed by removing a needle from the cylinder and a needle from the dial at prearranged positions around the machine. The dial needle is removed from the center of a block of cylinder needles to form even pleats or offset from the center to form narrow and broad pleats.

Interlock fabrics are not often knitted on double jersey machines but opportunities exist to produce these fabrics by changing the gating and selecting odd needles in the dial to work with odd needles in the cylinder at odd courses and even needles to work together at even courses. Opportunities exist here with acrylic yarns to produce the napped and sheared fabric suitable for outerwear purposes.

NKOA Convention

Textralized Yarns For The Future—A Broader Spectrum

By ALEX L. TRIFUNOVIC
Joseph Bancroft & Sons Co., Inc.

WE are today in an era of astonishing textile development. We can almost pinpoint the beginning by going back only a relatively few years to the introduction of continuous filament nylon. From this beginning, the industry proceeded to develop so-called miracle fabrics—fabrics with startling new features, fabrics that were machine-washable, wear-resistant, moth-resistant, crease-resistant, and amazingly durable. These were desirable and appealing properties to the consumer but, unfortunately, they were attended by characteristics less appealing and less desirable.

It was found, for example, that garments made of these synthetic fibers lacked the warmth, moisture absorption, and life of wool and cotton. No matter how the chemical formulas were changed, no matter whether the garment was knit or woven, the miracle fibers produced goods that were cold and sleazy to the touch, and somehow lifeless in quality.

It was obvious that the natural fibers of wool and cotton possessed hidden qualities that science had not yet been able to duplicate. And so a long period of intensive research began. Eventually, it was reasoned that perhaps the kinks and bends in natural fibers held the key to the secret because, of course, continuous filament yarn was straight, rod-like. Assuming that this was a significant difference, the problem then became one of finding a way to put these kinks and bends into the continuous filament yarns and to achieve this effect so that it would remain permanent under normal use.

This was not an easy problem to solve. It has taken us many years to develop the proper techniques and know-how to produce a commercially valuable crimped yarn that retains the valuable properties such as uniformity that continuous filament yarn does have. But we have succeeded. We have today mastered the crimping of continuous filament yarn to such a degree that not only are we able to control yarn uniformity and bulk level, but we can vary the hand and appearance in any fabric—from a very soft, cashmere-like hand to very harsh, almost to the feel of a quarter-blood wool hand.

I well remember, as a boy in the old country, helping with the shearing of mountain goats. What a job — and what a smell! Now we can make yarns which produce excellent fabrics with the hand of mountain goat wool but without the smell, and I wouldn't be surprised if the chemists in our laboratory could reproduce the odor, too, if we were foolish enough to ask for it.

We have learned, through research, what it is that makes the hidden qualities of natural wool —how a sheep's breed, environment, food and water affect its wool. In the same way, research has provided us with the same kind of knowledge about cotton. Today, when you get a cone of Textralized yarn, it is almost as though our licensees brought together all the different kinds of wool and cotton, carefully noted the most valuable characteristics, discarded the others, added a few new ones, and produced a most remarkable synthetic product.

We can now produce a wide range of Textralized yarns, all with certain basic properties, yet each especially tailored to individual applications.

Remarkable as these developments are, we are not satisfied by any means because there is more, so much more, that can be achieved.

We are interested in this future, because it is full of promise. Therefore, we are concentrating our enthusiasm, skill, and effort on improving Textralized yarns, and discovering the new potentials we know they possess. Our development program is not geared to the old "we're happy with what we have" attitude. We are convinced that unlimited possibilities are ahead, and we mean to discover them. For one thing, now that we have found the proper techniques for modifying continuous filament yarns such as nylon, Dacron, polyester, polyacrylic, polypropylene, and so forth, we are seeking to make our crimping process ever more versatile.

Now let us review some of the projects our research development program is concerned with.

It is common knowledge that since the introduction of modified continuous filament yarns, it has been almost impossible to prepare suitable dye packages for single end fine denier yarns.

The primary difficulty has been how to dye the yarn for optimum results and still maintain the package in such a condition that the yarn can still efficiently be recovered to produce a commercially saleable package. At the same time we had the problem of producing a dyed Textralized yarn without the loss of bulk. As we all know, in the present market for Ban-Lon end products, it is necessary to supply Textralized yarns of various bulk levels.

As an example, it is desirable in many cases that a Textralized yarn of a higher bulk level than standard be used to obtain the loft and stretch desired for Ban-Lon half hose. Therefore, it is of importance that the bulk level of the dyed Textralized yarn can be readily adjusted to meet the demand of the end products.

This is a relatively new development that is still in its infancy. We say that because the exciting results that have been obtained from our day-to-day research indicate vast potential. With this principle there is no limitation as to raw yarns that can be crimped by our process. To clarify this statement we also include natural fibers as well as synthetic fibers, and staple spun yarns as well as continuous filament, natural, and synthetic yarns.

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After we learned how to produce crimped yarns of uniform bulking levels and adaptable to all kinds of fabrics and garments, we felt that we would like to add a novelty effect to some or all of the end products.

The question was "Where do we start?" Well, ironically enough, we recalled the first time we made an interlock fabric from our first production lot of crimped yarns some few years ago; it appeared to be an almost intentional attempt to make a very lumpy or irregular looking cloth. Of course, this was not an attractive fabric simply because our un-uniformity was not uniformly un-uniform. In other words, if we could control to a uniform degree of un-uniformity, we would have a basis to work out a novelty effect yarn. Thus, we have now developed a uniformly controlled spaced thick and thin novelty effect Textralized yarn.

Non-Stretch Bulked Yarns

Contrary to almost all crimped continuous filament yarn, conventional spun staple yarns have one common physical property; that is, they are capable of carrying the tension in the yarn without significant extension, thus retaining their bulk under reasonably heavy tensile loads. Such stability under tension allows the yarn to be used in tighter fabric constructions like woven goods, warp knits, etc.

Among the several approaches to the technique of producing non-stretch bulked yarn we have found that a minor modification of our crimping machinery will give the desired end results.

There is much more about this subject I would like to discuss with you but time will not permit.

Because of their versatile properties, Textralized yarns have become a basic part of the textile industry. They can be engineered to meet the knitter's most exacting demands, and translated into Ban-Lon apparel, they satisfy the consumer's desire for comfort, appearance, quality, and easy care.

But we've really only scratched the surface. The future holds fantastic possibilities — possibilities of interest and benefit to you, your customers, and your customers' customers.

Textralized yarns — with new shapes, new characteristic, and new end uses — will be a very important part of the textile fields that lie beyond the New Frontier.

NKOA Convention

Developments In Acrilan, Acrilan-Spectran And Cadon

By C. C. MADEIRA, JR.
Director, Commercial Development
The Chemstrand Corporation

WE have not been idle in the last year, for while Acrilan in somewhat traditional bulky sweaters has been on the market, we have been working on combinations of our Types 16 and 1656 to give two-color effects in one dye bath. Probably most of you are familiar with the fact that these two fibers have significantly different dye sites and that, therefore, two color effects in one dye bath are achievable. We have been plugging this potential for some time now, with the result that these representative sweaters are presently on the market and gaining more acceptance with each passing day. Nor do we think the possibilities have been exhausted; we are working on the thought that nubs of one fiber may be used in yarns of the other to produce interesting style effects. So the Acrilan sweater program for 1961 represents a very merchantable package.

What are our thoughts for the years ahead? We see both acrylics and nylon making progress. Our chart illustrates consumption of fiber by your industry from 1951-1960. We look for a continuation of the penetration of acrylics — mostly in staple or tow form, and of nylon in textured filaments.

Acrilan-Spectran, our solution dyed acrylic developed primarily for a knit pile trade, where the integral color of the fiber yields a most luxurious hand as opposed to wet processed fiber, offers interesting possibilities for sweaters. It has the performance qualities of other Acrilian fibers, dimensional stability to washing, soft hand, is non-allergenic, mothproof, and of course, because of good bulk, warm.

Combination of this fiber with our Type 16 and 1656, particularly in two-ply yarns should yield interesting three-color effects in one dye bath and should offer many knitters the possibility of much more economical operations than the present tow dyes. For instance, most Oxford type yarns today are a combination of three tow-dyed colors which have to be decided upon while natural tow is at the dyers, several weeks before the same tow is processed into yarn. With a Spectran, 16, and 1656 combination, yarns could be on hand at a spinner's mill and then dyed in yarn form, going directly from the dyer to the knitter. While it is a little early to estimate just how successful this route may be or just what savings may accrue to spinners and knitters alike, we think that it has interesting cost savings and are actively investigating it. There are also interesting possibilities for the use of Spectran in combination with both of our other fibers, for in Spectran/16 combinations, the Spectran will be overdyed with basic dyestuffs, while in Spectran/1656 blends, it would be possible to use acid dyes on the 1656 without affecting the Spectran color. These are just a few of the routes whereby we expect to increase the penetration of Acrilan into the sweater market.

Turning to nylon, Chemstrand has long enjoyed a preeminent place as a supplier to processors making textured yarns for the sweater trade. This year the need for a new look and sparkling highlights has resulted in our introduction of Cadon—in a sweater by Alice Kay Knitwear. Some of you may have seen the poster which adorned many of the commuter stations in the New York area. These multilobal yarns contribute a new dimension in sweaters, a cover potential and delectable touch which will make this year's styles desirable, last year's obsolete. We expect to continue such innovations as Cadon as we see market potential developing, and the year 1961 appears to be a good one for sweaters possessing the aesthetics of this our present Cadon yarn.

These products, Acrilan 16, 1656, Spectran and Cadon are the Chemstrand front line most readily visible to our customers and competitors alike, but behind them as behind any well organized army or team are numerous facilities which are not so obvious. I'd like to take just a moment to touch on the two principal phases of our behind the scenes operation:

First is research and development, — an organization which has only recently assumed full stature with us, each segment with its own facilities and staff. These three slides show (1) our Chemstrand Research Center, Inc. in Durham, N. C., dedicated in February of this year and staffed by more than 300 technologists in 91 laboratories. We expect big things of the Center in the years ahead, —its facilities are at the service of all Chemstrand customers. (2) The Nylon Development Center in Pensacola, where new nylon yarns are brought a step nearer commercial production, and (3) The Acrilan Development Center in Decatur, Alabama. All of these facilities have been improved and further equipped this year. While Nylon Development refined and improved Cadon, Acrilan Development was hard at work formulating colors for Acrilan-Spectran. In the years ahead all three of these organizations will be working on improved and more saleable products for Chemstrand customers.

Second, we turn to merchandising, advertising and promotion. These groups have built a very favorable reputation for the Acrilan A and the Chemstrand C programs.

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Advances In Textured Nylon Filament For Knitwear

By JAMES W. BOLMEYER
Textile Fibers Department
E. I. du Pont de Nemours & Company

TEXTURED nylon filament yarns have occupied an important place in the knitted outerwear field for several years but their full growth potential has not been realized. Previously, throwsters have offered excellent yarns from their various crimp and false twist texturing processes in a variety of yarn counts and filament deniers. Something new and unique, however, is needed to stimulate further growth in the use of textured nylon yarns. To help provide this stimulus, we would like to discuss two recent commercial developments.

A year ago, Du Pont introduced special nylon yarns with physical properties and characteristics specifically engineered for use in texturing operations. These supply yarns, designated as Type 288 nylon, result in textured yarns with more stable and uniform properties and allow development of even greater bulk levels when desired. All texturers are now familiar with these widely used products.

During the same period, Du Pont introduced Antron trilobal multifilament nylon yarns which, when used in place of the traditional round cross-section nylon yarns, give fabrics and garments a more pleasing hand, greater covering power, and, more important, a rich luster and appearance. Again, these Antron yarns for texturing, designated as Type 568 nylon, are engineered for specific uses.

These yarns can be used to impart many new desirable effects in knitted outerwear. They are offered in 10 different deniers from 20 denier and up, 13 different filament counts, plus bright, semidull, and dull lusters in many of these counts.

Antron trilobal multifilament nylon yarn already has created new fashion excitement in women's sweaters. Last fall, a very successful program was executed by a leading women's wear knitter. It was based on a bulky-type garment representing a styling innovation not previously available from textured nylon yarns, since the specific stitch and yarn count used presented optimum conditions for the unique luster and hand of Antron to have its full effect. This program is being broadened this spring, and it is expected that several other knitters will develop similar garments.

Antron is becoming more important in women's knit dresses, too, where again unique luster and hand create new styling values and selling points. Antron is expected to penetrate fine gauge knitwear as creative styles are developed, and we expect this direction will help create a resurgence of interest in textured nylon in fine gauge sweaters for women's wear.

In men's wear, Antron is moving from broad use in men's full-fashioned sweater-shirts for spring to a broad range of classics in cardigan styles, pullovers, vests, and, in addition, mid-weight patterned bulkies for fall.

The major yarn counts being used for the full-fashioned and classic items are 70 denier, two-to-five ply; in the mid-weight bulkies, 200 denier up to six ply. Other areas are under investigation in men's wear such as cut-and-sew sweater-shirts from circular knit goods of either 100 per cent Antron trilobal multifilament nylon yarn or combinations of Antron with Orlon acrylic fiber and with cotton. This latter area is just beginning to advance and is certainly worthy of consideration. Most of the fabrics of Antron to date are bulked on the Textralized, Agilon, Mylast, and Tycora processes, but use of other texturing processes is quite possible.

Since the texturing process tends to reduce the reflected highlights in Antron yarns by scattering and softening the luster, lower bulk levels are maintained in texturing in order to achieve a more lustrous highlight. For maximum luster retention in the textured yarns, it has been found desirable to reduce bulk levels by as much as 10 per cent from that normally used for standard round cross-section textured nylon yarns. In knitting full-fashioned garments, 21 gauge machines are commonly used, employing various ply constructions of 70 denier yarn. For the mid-weight bulkies, 10-cut circular interlock machines are being most widely used.

In knitting and finishing garments of Antron, procedures which have been used for handling standard round nylon yarns are recommended when equivalent bulk levels are being sought. Where different bulk levels are desired, some modification in yarn size selection, stitch settings in knitting, and slight changes in finishing procedures should be investigated to achieve optimum results. In addition to the possibility of obtaining greater degrees of subtlety in luster, other advantages of Antron textured nylon yarns such as reduced fabric pickiness and fuzziness and improved stitch definition have been reported by important knitters.

Although filament nylon yarns have been with us for more than 20 years, realization of their full potential in knitted outerwear is only in its infancy. Continuous filament Antron trilobal multifilament nylon yarns, in combinations with various trade texturing processes, have opened up a new area for development of exciting fabrics.

The two developments we have mentioned are just a hint of new things we visualize for your market. You are no longer being given yarns that were developed for weaving end-uses, but yarns engineered for texturing and for subsequent use in knitwear. The concept of Antron yarns developed rapidly during 1960. This year, even greater use of this fiber is expected and as additional incentive for such expansion, a concentrated advertising and promotion program is being provided by the industry and Du Pont.

ABSTRACT—POLYAMIDE TREATMENT OF WOOL FOR SHRINK RESISTANCE

By W. FONG
Western Regional Research Laboratory
U. S. Department of Agriculture

A NEW technique is described for making wool fabrics shrink-resistant through the formation by interfacial polymerization (IFP) of a thin polyamide film on the fiber surface. Basically, the treatment involves the successive application to wool fabric of an aqueous solution of a diamine and a water-immiscible solvent solution of a diacid chloride. This results in an almost instantaneous formation of a shrink-resist resin finish without necessity of heating or curing.

Results of process development studies aimed toward a practical continuous process are briefly summarized, including the selection of reagents and solvents, methods of application, significant processing variables, required equipment, and necessary post-treatment finishing procedures.

Chemstrand Fiber Developments Noted

(*Continued from Page* 172)

We at Chemstrand expect to do more and more business in the sweater field in the years ahead. We expect our research and development to bring forth new and modified fibers to join our Acrilan, Acrilan-Spectran, and Cadon. We expect our merchandising, advertising, and promotion to continue to create a favorable climate among consumers for the sale of our products. We look forward to serving more and more sweater customers and we firmly expect to make their business better by the inclusion of our fibers in their lines.

NKOA Convention

Recent Advances In Orlon Acrylic Fiber For Knitwear

By JOHN C. HOSCHEIT and THOMAS F. CARROLL, JR.
Textile Fibers Department
E. I. du Pont de Nemours & Company

In this paper the development and application of three new Du Pont fibers for the knitwear industry, will be discussed. These are Orlon Type 44 acid dyeable fiber, Orlon Type 28 durably slickened fiber, and Orlon Type 72, a fiber for blending with cellulosics, are discussed.

Last December, after considerable internal testing to satisfy stringent research objectives, Du Pont announced that sample quantities of an Orlon fiber possessing outstanding anionic dyeable properties were being made available for trade appraisal. This new fiber, known as Orlon Type 44, when used with basic dyeable Orlon Type 42, offers the knitter styling possibilities via piece dyeing. The trade response and reaction to Orlon Type 44 has been truly encouraging. Work is currently under way at our Camden, S. C., plant to provide the knitting trade with significantly larger poundages of the fiber appropriate for the trade appraisal to establish the true opportunity for Type 44. Additional pounds of Orlon Type 44 should be available late in May or early June.

Now, let us take a closer look at those properties of Type 44 which make it an outstanding addition to our family of Orlon fibers. First, Type 44 tow, which is presently available in both three and six denier per filament, is semi-dull in luster and of regular shrinkage. It can be processed satisfactorily via the Turbo Stapler to obtain yarns of the preferred 22 to 24 per cent shrinkage level. Slight modifications, however, are necessary when processing Type 44 on this equipment. Table I shows typical settings for the Turbo Stapler for both Orlon acrylic fiber Type 42 and Orlon Type 44. You will note that Type 44 requires a slightly lower stretch and draft than does Orlon Type 42. If Type 42 conditions are used to process Type 44 on the Turbo Stapler, yarn shrinkages in the range of 35 per cent will be obtained.

Orlon Type 44 staple products, available in a semi-dull luster and in regular shrinkage, are produced in cut lengths suitable for processing on the American and cotton systems. Our laboratory and trade tests have shown that processing characteristics of these staple products are comparable to those of Orlon Type 42. High shrinkage Type 44 staple products will be available later this year.

The knitting performance of Orlon Type 44 alone or in blends with Type 42 has been excellent. In fact, the knitters who have evaluated this fiber find it is comparable to Orlon Type 42 in knitting performance. A list of tints to identify yarns of Type 44 is available. Additional tints are being tested and will be added to this list when they are considered acceptable.

Secondly, and perhaps most importantly, the dyeing characteristics of Orlon Type 44 are excellent. The lightfastness of Type 44 will generally exceed 40 Fade-Ometer hours.

Dyed yarns of Type 44 Orlon tested by the accepted 140° F. washing test exhibit good washfastness. Laboratory tests also show that acid dyes on Type 44 have good fastness to crocking, perspiration, dry cleaning, and hot moist pressing conditions. Clear, bright shades of acid dyes on Type 44 with essentially no cross staining of these dyes on Type 42 Orlon acrylic fiber are possible. When Type 42 fibers are dyed with cationic dyes and Type 44 with acid dyes, the dyer has a true one-bath, one-step commercial dye procedure.

To the knitter this means greater versatility than ever before with Orlon. The economic advantage of piece dyeability to obtain styling through stripes, heathers, and patterns is realized. When color-sealed black

(*Continued on Next Page*)

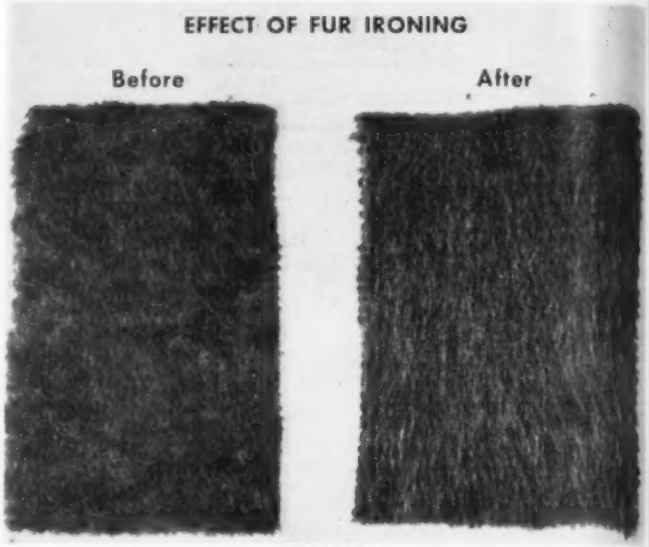

FIGURE 1

TABLE I

TURBO STAPLER* CONDITIONS

	"Orlon"** T-42	"Orlon" T-44
Heater plate temperature	275°F	270°F.
Stretch ratio	1.58	1.23
Break zone draft	3.11	3.31
Breaker bar draft	1.37	1.21

TABLE II

ADVANTAGES OF "ORLON" TYPE 72 / COTTON BLENDS

Features

- Outstanding comfort values in hot and cold-weather next-to-skin wear.
- Whiteness equal to bleached, brightened cottons without need for bleach.
- Whiteness stability in home laundering.
- Retension of softness and dimensional stability in repeated laundering.
- Dyeability, coloration values, and general physical properties equal to regular "Orlon" Type 42.

Orlon is used, a third dimension in coloration is possible.

The second of our recently developed fibers of Orlon is Type 28, which will be used primarily to produce an animal effect handle and touch in knit fabrics similar to that of mohair. The fiber is designed for use with Orlon Sayelle bi-component acrylic fiber. A blend of 25 per cent Orlon Type 28 and 75 per cent Orlon Sayelle has been found to be best for processing as well as for optimum fabric aesthetics.

Blends which exceed 25 per cent Type 28 tend to detract from the desirable aesthetics of Orlon Sayelle. Therefore, they are not recommended. Orlon Type 28 derives its smooth, slick tactile aesthetics from new principles of spinning to obtain surface smoothness and low-friction fibers. The fiber is produced with low crimp, a bright luster, and is available in 8.5 denier per filament and 4½ inch cut length.

Our present Type 28 product must be blended with Orlon Sayelle bi-component acrylic fiber prior to carding. However, work is under way to produce a fiber that can be processed in 100 per cent form for top blending. No special knitting techniques are required when using the blend of Type 28 and Orlon Sayelle. The yarns are knitted in exactly the same manner as 100 per cent Orlon Sayelle yarns. The fiber can be dyed or left white and blended with stock dyed Orlon Sayelle for heather and cross dye effects or can be union dyed by modifying the dye procedures used for 100 per cent Orlon Sayelle. Detailed procedures to give satisfactory union or tone-on-tone effects in a full range of shades are now available from many dyers.

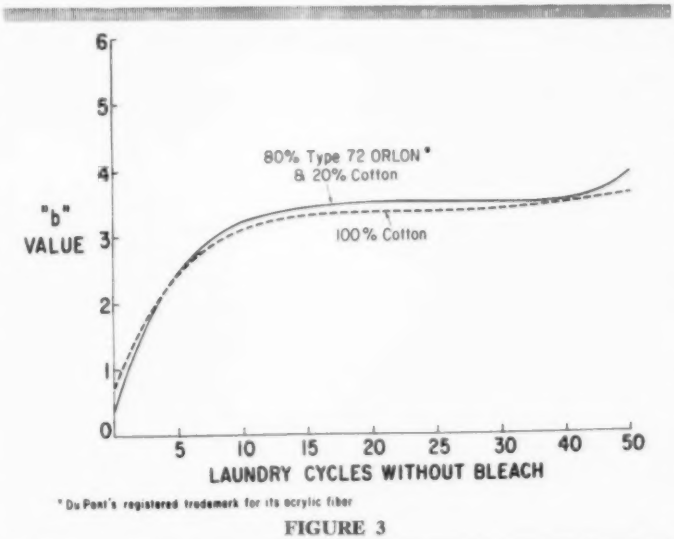

FIGURE 3

Blend fabrics of Orlon Sayelle and Orlon acrylic fiber Type 28 can be brushed in order to give surface effects. The newest technology to be developed by Du Pont for use with Orlon Sayelle is the fur ironing technique. Fur ironing has been used for some time with deep pile or fur fabrics to straighten fibers and increase their luster. Figure 1 shows the effect of fur ironing. The same fabric, with and without fur ironing, is seen. Note the change in the surface character of the fabric on the right which has been fur ironed.

The last of our new fibers is Orlon Type 72. This fiber, of 1.5 denier, 1½ inch with a built-in whitener, is designed specifically for blends with cellulosic fibers, particularly cotton. The advantages to be gained by the use of Orlon Type 72 are seen in Table II. Outstanding comfort for skin contact apparel use is one of the fiber's prime advantages. Whiteness, essentially equivalent to bleached and brightened cotton, and retention of whiteness, garment shape and hand are other important features. Dyeability equal to that of Orlon acrylic fiber Type 42 has been maintained.

As we have done with Orlon Types 44 and 28, let us take a closer look at some of the properties of Orlon Type 72 which make it an important fiber for knitwear. Here we see (Figure 2) the year by year improvement of Orlon Type 42 regarding whiteness. Note the ranges of bleached wool and bleached cotton. In this illustration, we express whiteness in terms of "B" values. The higher the "B" value, the more yellow is the fiber sample. One "B" value unit is about the maximum that can be discerned by the human eye. Colormetric instruments are used to read "B" values. Type 72 reaches the upper limit of bleached cotton. As we said earlier, Type 72 Orlon retains its whiteness. Figure 3 shows the "B" value readings of garments produced from a blend of 80 per cent Type 72 and 20 per cent cotton versus one of 100 per cent cotton. Please note how the two curves stay together through 40 and 50 launderings.

Figure 4 is an example of the dimensional stability to be realized with the Orlon Type 72 and cotton blend. The T-shirt on the left is the Orlon Type 72 blended with cotton and the T-shirt on the right, 100 per cent cotton. The blue background represents the original shape of the garments. After 50 launderings, note the considerably shortened length of the cotton T-shirt while the Orlon acrylic fiber Type 72 and cotton blend fabric remains essentially unchanged. It should be emphasized that the soft hand also remains after repeated launderings.

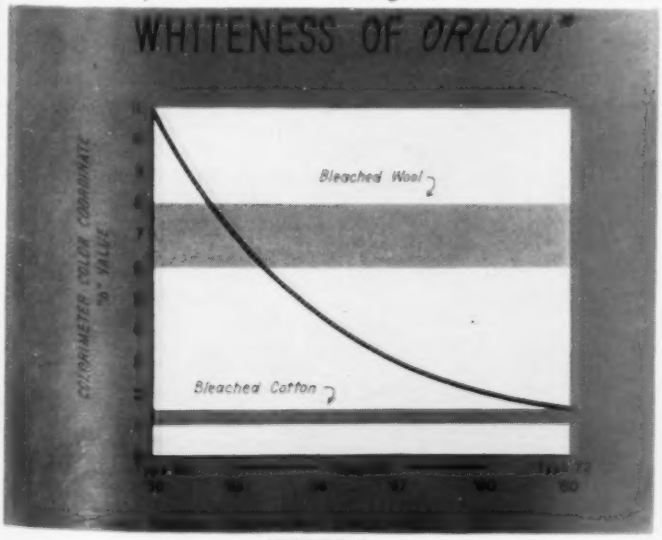

FIGURE 2

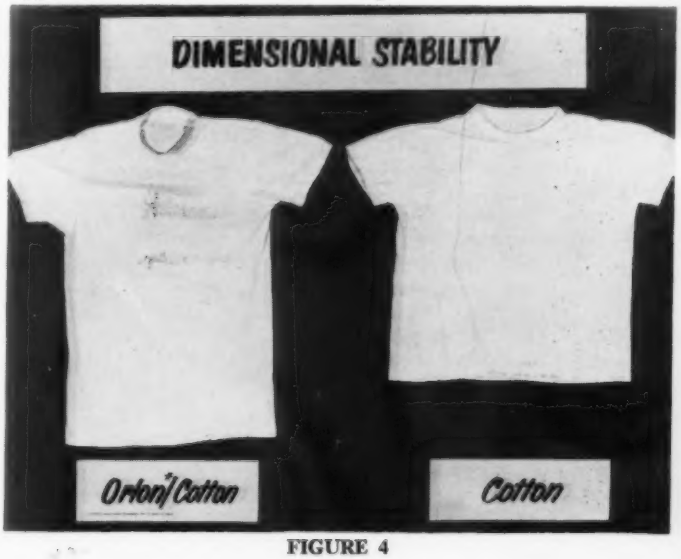

FIGURE 4

NKOA Convention

Application Of Orlon Sayelle Bi-component Fiber In Knits

By KENNETH C. BASS, JR.
Textile Fibers Department
E. I du Pont de Nemours & Company

ORLON SAYELLE bi-component acrylic fiber represents a major technical breakthrough—a new concept in man-made fibers. Obviously, this revolutionary new fiber will create for our knitted outerwear industry very important new marketing opportunities. I want to tell you about some of these new sales opportunities and to outline Du Pont's marketing strategy for Orlon Sayelle.

We have talked on past occasions about the growing importance of the family of Orlon fibers. We have emphasized our intent to market new products, in that family, to fulfill specific needs, not for the sake of "newness" itself. Modern industrial technology has repeatedly demonstrated its ability to tailor-make new products to do a selected job better than it has ever been done before. This is true of the plastics and rubber industries, and we want to work with you to make it a way of life in knitted outerwear. This was the marketing philosophy on which research leading to Orlon Sayelle was based — a deliberate plan to create an entirely new class of Orlon fibers to satisfy studied market needs. We in Du Pont Textile Fibers long ago passed the point of inventing fibers first, then trying to discover where and how they could be used.

Orlon Sayelle bi-component acrylic fiber is not just one fiber, nor even two fibers. While there are only two types available today — Orlon Sayelle Type 21 and Type 24 — we will be producing other fibers in this group in the future as we develop other family members to give this industry new tools for styling and fashions.

Orlon Sayelle fibers are primary elements in Du Pont's strategy to keep Orlon acrylic fiber to the fore of fashion in sweaters. It is our firm intention to firmly establish Orlon as a basic building block for knitted outerwear — to establish Orlon as the preferred fiber for every price class, for every type of garment and for every department in the store. Orlon Sayelle figures importantly in this strategy because these figures will provide the high-class, prestige umbrella for the entire family of Orlon fibers.

Now, let's look at some of the technical aspects of these new fibers. Fiber availability is given in Chart 1. Orlon Sayelle Type 21 is available as three and six-denier per filament staple with a variable cut length of 2.5 to five inches, at an average of 3.75 inches in length. Orlon Sayelle Type 21 tow is available only for the Pacific Converter at six denier per filament. Orlon Sayelle Type 24 is available only at present in three denier per filament staple, again with a variable cut length of one to five inches, at a three inch average.

You will recognize that the variable cut length of the staples limits processing to the worsted system.

As I will discuss in greater detail later, Type 21 is intended for use in heavier counts for bulky-type sweaters, while Orlon Sayelle bi-component acrylic fiber Type 24 is used for finer gauge garments.

While these new fibers do have an anti-static finish, we suggest that mills who normally use a supplemental finish continue to do so when spinning yarns of Orlon Sayelle. Such proprietory finishes as Nopcostat LV-40 or Zelec NA have been used with very good results, using an emulsion of one part finish and four parts water. We suggest application of one to two per cent of this emulsion (based on fiber weight) to give a pickup of one-quarter to one-half per cent.

A second factor during yarn spinning is that the twist level must be chosen to allow adequate development of fiber crimp and yarn bulk later. Typical suggestions for twist level are given in Chart 2. We recommend for Type 21, a seven turn singles twist and a ply twist of 3.5 to four turns per inch for a 2/20's worsted-count yarn. For Orlon Sayelle Type 24, use a singles twist of 11 turns per inch and a ply twist of 4.5 to five turns per inch for a 2/30's yarn. These values are only general guideposts, and other good yarn specifications can be worked out by experimentation.

There are still some problems with piece dyeing of sweaters of Orlon Sayelle bi-component acrylic fiber. This arises from the fact that shrinkage levels differ for both types from light to dark shades.

Thus, there must be adjustments at the knitting machine depending on the eventual shade intended for the garment. This works well but it does present some inventory and other practical problems. Skein or package-dyed yarns do a first-rate job. One critical step must be carried out somewhere during the dyeing operation; the fiber must be brought to the boil. This "triggers" the crimping action built into each filament and develops crimp and bulk. Exposure at the boil can take place either in dyeing, bleaching or scouring.

Since the Orlon Sayelle fibers are quite different from other family members of Orlon acrylic fibers, it is not surprising to learn that certain new factors must be considered during knitting.

You must allow for a certain amount of fabric relaxation, as shown in Chart 3. With Orlon Sayelle Type 21, allow for 20 to 25 per cent yarn shrinkage for skein-dyed yarns and 15 to 20 per cent for package-dyed yarns. Corresponding values for the Type 24 product are 15 to 20 per cent for skein-dyed and 10 to 15 per cent for package-dyed yarns. Please note that full bulk development cannot be obtained by simply steaming the garment. It must be wet out at 120 to 130 degrees Fahrenheit and then tumble dried to develop maximum bulk.

Let me emphasize that Orlon Sayelle bi-component acrylic fiber Type 21 is directed at bulky-type garments with novelty chain or other surface-interest stitches. In the case of Type 24 we strongly urge that it be used only in two-ply yarns for full-fashioned or jersey constructions.

We have not yet worked out conditions for use in other constructions, such as interlock or double piques.

Finally, it is imperative that garments be wetted out and tumble dried prior to packaging. This insures that maximum bulk is attained. It also helps assure your customer of perfect fit and no-shrink garments when they are washed properly.

Garments of Orlon Sayelle launder beautifully but they must be handled properly during laundering. Consumers must

(*Continued on Next Page*)

CHART 1

FORMS OF ORLON SAYELLE BI-COMPONENT FIBER

Type 21

STAPLE	
3 and 6 dpf	Variable cut- 2.5 — 5.0″ Av. = 3.75″
TOW	
6 dpf—for Pacific Converter	
Type 24	
STAPLE	
3 dpf	Variable cut- 1 — 5″ Av. = 3″

CHART 2

ORLON SAYELLE BI-COMPONENT FIBER TWIST LEVELS

Type 21	2/20's Worsted Count	7 tpi Singles 3.5-4 tpi Ply
Type 24	2.30's	11 tpi Singles 4.5-5 tpi Ply

CHART 3

ORLON SAYELLE BI-COMPONENT FIBER AVERAGE YARN SHRINKAGE AFTER KNITTING

	% Shrinkage Skein-Dyed	% Shrinkage Package-Dyed
Type 21	20-25	15-20
Type 24	15-20	10-15

be taught how to take advantage of the automatic re-blocking which is built into every knitted garment of Orlon Sayelle. We have a strong program under way with stores and consumers, including garment hang-tags, to put across this major selling advantage.

Garments grow when wet and this removes all distortion produced during wear. When properly dried, they return to their initial size and shape and with all the outstanding elasticity of cuffs and bands restored completely. Garments can be washed by machine and tumble dried. This gives excellent results. They can be hand-washed — in which case they may be tumble dried or dried on a flat surface. They cannot be hung up to dry because the weight of the wet garments will prevent them from returning to size and shape during drying.

In review, then, I think there are three basic and very important points that will tell the story of handling Orlon Sayelle bi-component acrylic fiber properly.

First, the fiber must be brought to the boil somewhere in the process to "trigger" the crimping action. This will give full shrinkage and bulk. Second, the fabrics must be knit loose enough to allow for fabric relaxation on wetting out and shrinkage on tumble drying. Finally, the garments must be wet out and tumble-dried as the last operation. This again is to give maximum shrinkage. These are the three most important steps in handling Orlon Sayelle and proper attention to these factors will yield first-rate results every time.

NKOA Convention

Development Of Orlon Sayelle Bi-component Acrylic Fiber

By DR. MYRON Q. WEBB
Textile Fibers Department
E. I. du Pont de Nemours & Company

THE Du Pont Company announced last year a new form of Orlon acrylic staple called Orlon Sayelle bi-component acrylic fiber. This new product possesses an important new characteristic never before achieved in a synthetic fiber—that of a permanent reversible spiral crimp. Today, we wish to discuss the theoretical background which forms the base for this product and show how this product is especially useful to the knitting industry. The work we are reporting was conducted in three Du Pont laboratories: the Benger Laboratory in Waynesboro, Va., the Textile Research Laboratory in Wilmington, Del., and the Technical Laboratory in Camden, S.C.

The behavior of wool has long been recognized as unique and outstanding among natural fibers. Wool exhibits a very high degree of crimp which is important to its tactile properties. It exhibits unique behavior in its responsiveness to finishing and wet processing.

One of the basic causes for this lies in the crimp characteristics of wool. It possesses a permanent spiral crimp which changes depending upon its environment. For example, its crimp decreases when the fiber is wet and then increases to the original level upon drying. This has been termed crimp reversibility. Wool also has a high degree of bulk, resulting from its three-dimensional crimp structure. J. Menkart and J. C. Detenbeck of the Textile Research Institute have related bulk of wool directly to the degree of the crimp, while studies within Du Pont have shown the influence of three-dimensional crimp upon aesthetics. These properties of crimp — reversibility of crimp in wet and dry processing and permanent spiral crimp — have long been aimed for in man-made fibers.

Many investigators have studied the crimp characteristics of wool, including the property of crimp reversibility. For example, the study of wool's response to a number of physico-chemical conditions was carried out as long ago as 1886. W. MacMurtrie at that time observed the differential swelling from one side of a wool fiber in potassium hydroxide solution. H. J. Woods, in 1935, studied the twisting and curling of wool in water, while G. Berg, in 1937, studied its twisting and curling in steam. Both studies were aimed at indicating the cause of twisting and curling, or live behavior of wool.

It remained for M. Horio and T. Kondo, in 1953, to reveal a definite structural asymmetry of wool fibers which could be correlated with their coiling and crimping nature. They used staining techniques under precisely controlled conditions of pH. These investigators showed a difference in dye receptivity for the two sides of the wool fiber. They thus correlated this differential dyeing with the coiling and crimping nature of wool, and related a structural asymmetry or bilateral structure to the crimping and coiling of wool.

E. H. Mercer, in 1953, provided direct chemical evidence that the wool cortex comprises two parts, which he referred to as ortho- and para-cortex. He treated wool fibers with peracetic acid, which dissolved a portion of the structure. Using microscopic techniques, he found that fibrils remained on only one side of the cortex and, after the removal of the ortho-cortex portion from the fibers, he found that the para-cortex is present in spiral form within the cuticle sheath. Further work on wool structure has been summarized by Textile Research Institute collaborators in the proceedings of the International Wool Textile Research Conference held in Australia in 1955.

As a principle, it appears logical that if a bilateral structure could be accomplished in a synthetic fiber and if these components responded properly to physicochemical conditions, a combination could be made in one fiber of these properties of a synthetic along with the characteristics typical of wool.

In early work, W. A. Sisson and F. F. Morehead, of the American Viscose Corporation, produced crimped rayon by the two-component approach. On a commercial basis, a cellulose fiber called Fiber E filament yarn, as well as a crimped staple

(*Continued on Page* 178)

made by Du Pont, involved a degree of bilateral structure. In these structures, the bilateral character was used to advantage to develop crimp (as in a sodium hydroxide boil-off), but reversibility of crimp was not of the same order as for wool.

Research has made possible the development of a bilateral structure in an acrylic fiber, commercially introduced by Du Pont as Orlon Sayelle bi-component acrylic fiber.

E. M. Hicks, Jr., discussed properties of the new acrylic fiber at the Textile Research Institute meeting in New York City last March 24 and 25. This morning, I also want to discuss fiber properties and response to conditions encountered during dyeing and finishing.

Two-component spirally crimped filaments have been produced within the acrylic polymer system in the denier range of normal apparel fibers (three to six denier per filament) with a structure tailored to respond to physicochemical conditions as encountered during dyeing and finishing (both wet and dry processing as well as dyeing conditions). Components of this new fiber involve unique chemical modification of acrylonitrile polymer to achieve differential properties across the fibers. Unusual engineering requirements were involved, since the filaments have diameters less than one thousandth of an inch. Novel equipment of high precision had to be developed for the job.

In appearance, the fiber differs significantly in cross section from conventional Orlon acrylic staple. The cross section is rather acorn-shaped rather than the familiar dogbone and is not unlike wool in this regard. In longitudinal appearance, as the fiber is produced, there is a mild, three-dimensional crimp which is fully adequate for textile processing.

Now let us look at the usual physical properties of this fiber compared to Orlon acrylic fiber Type 42 and wool. As can be seen from the data in Table I, Orlon Sayelle bi-component acrylic fiber does not differ significantly from the standard version of Orlon; hence, it has similar physical performance characteristics.

Far more important than the normal fiber physical properties is the way Orlon Sayelle bi-component acrylic fiber behaves under various environmental conditions. First, considering its response to heat, we find that one side of the fiber shrinks more under heat than does the other. The immediate result is a high degree of three-dimensional spiral crimp. It is immediately evident that the nature of the crimp is quite similar to that of wool and entirely different from the mechanically induced crimp in most synthetics. The spiral crimp is obtained very readily in hot water, as would occur in a boil-off or dyeing procedure, and upon drying, it becomes fully developed.

A second response of the fiber is its live behavior on wetting and drying. One side of the fiber swells more than the other. The side which has shrunk more when heated swells more with water and actually elongates, thereby decreasing crimp. Recrimping occurs as water is removed by drying. This crimp reversibility gives a fiber which wet-works or squirms during finishing. This wet-working constantly renews the original configuration of the fiber after initial crimping. In addition, it gives some degree of fiber intertwining for added cover in fabrics, but without felting action.

Two types of Orlon Sayelle bi-component acrylic fiber are now marketed — the original product Orlon Sayelle Type 21 and the newer product designed for use in classic sweaters, Orlon Sayelle Type 24. These products differ principally in crimp level. The three denier per filament Type 21 has a higher crimp (about 16-to-18 cpi) while the three denier per filament Type 24 has a crimp level of about 10-to-12 cpi. This means that in knitted fabric form, use of Type 24 results in a finer, wool-like touch (like 80's wool), while use of Type 21 in knitted fabrics imparts a somewhat coarser wool-like touch closely simulating 64-70's wool. In addition, the Type 24 fiber is much more pill-resistant than is Type 21, and as such, can be used in two-ply 30's w.c. yarns for classic sweaters. This product, it should be emphasized, has about the same degree of pill resistance as standard Orlon acrylic staple Type 42.

We have in this bi-component acrylic fiber one which gives three-dimensional crimp on heat treatment and a reversible crimp upon wetting and drying. What effect does this have on fabrics? One of the most apparent results is aesthetic. The hand is very wool-like, exhibiting more bite and compressional resilience than is noted with conventional acrylic fibers. The wool-like character is quite evident in yarns, sweaters, and other knitted goods as well as wovens and suitings prepared from this fiber.

Second important characteristic imparted by this fiber is fabric elasticity. As can be seen from the stress-strain hysteresis behavior of spun yarns of Orlon Sayelle bi-component acrylic fiber, there is a degree of elasticity imparted by the character of the crimp which is quite unusual in synthetics, but which has heretofore been an attribute monopolized by wool. This can be seen in a practical way in a hand knitting yarn where elasticity is of vital importance. Another practical demonstration is in sweater bands where elasticity is essential to performance.

A third characteristic imparted to fabrics by this type of fiber is loft or bulk in combination with lightness. It is possible to get high-bulk without coring in the cross section of the fiber bundle. It is not necessary, then, to use two kinds of fiber — high and low shrinkage — in a single spun yarn to get high-bulk. Comparison in various knit structures such as sweaters indicates the nature of the loft which can be obtained with a bilateral fiber in contrast to a conventional monofiber.

The final benefit in fabric form of the two-component fiber is somewhat more subtle, but very important. The two-component fiber has less tendency to compact under heat and pressure. Recovery from hot compacting is rapid when steam is applied to cause the two components of the fiber to swell to different extents. This behavior can be seen from application of the Busse pellet demonstration, in which a fiber mass is compacted under heat and pressure and then treated with steam. Whereas wool bulks up after being pressed and then steamed, conventional acrylic fiber does not recover its bulk. The two-component fiber actually fluffs up to the same degree as wool. The same behavior can be seen in the case of fabrics which have been exposed to a hot iron and then steamed. Steaming leads to the recovery of the appearance of the fabrics from two-component fiber.

As mentioned earlier, this new fiber is affected by moisture. I would like to discuss now the effect of moisture in spun yarns and fabrics. If a skein of yarn of either wool or Orlon Sayelle bi-component acrylic fiber is wetted, it will grow or elongate; thus some debulking occurs, since crimp is being removed. When moisture is re-

(*Continued on Page* 178A)

TABLE I

FIBER PHYSICAL PROPERTIES*

	Orlon Sayelle bi-component acrylic fiber	Orlon acrylic fiber Type 42	Wool**
Dry tenacity, grams per denier	2.3	2.3	1.5
Dry elongation, per cent	38	28	28
Wet tenacity, grams per denier	1.8	1.7	1.2
Wet elongation, per cent	40	32	40
Loop tenacity, grams per denier	1.6	1.6	1.1
Loop elongation, per cent	14	17	18
Initial modulus	38	35	27
Moisture regain, per cent	2.6	1.7	15
Specific gravity	1.18	1.18	1.32
Fiber stick temperature, degrees centigrade	250	255	

* 70 degrees Fahrenheit, 65 per cent relative humidity
** Average 25 samples—58's to 70's wool

moved, the fiber recovers its crimp and bulk again.

A comparison of moisture versus length shows the effect of relative humidity on skein length of both wool and Orlon Sayelle bi-component acrylic fiber. The similar behavior again shows the wool-like character of this new product. It is this reworking upon wetting and drying that allows the surface of fabrics to be renewed by such cleaning operations as laundering.

This new fiber can be dyed to a complete shade range of acceptable colorfastness. Both Sevron cationic and disperse-type dyes can be used. This product has a faster dye rate with cationic dyes than does Orlon acrylic fiber Type 42 and, consequently, temperature control combined with use of retarders to achieve level dyeing is necessary. Dye bath temperature should be raised from 180 degrees Fahrenheit to the boil at a rate of one degree per minute. Disperse dyeings have less shade build-up on Orlon Sayelle than on Orlon Type 42; consequently, their application should be limited to pastels. A Technical Service Bulletin is available which gives the dyeing details.

Disperse and cationic dyes can affect fabrics of Orlon Sayelle differently unless used properly. Sweater bodies made from Orlon Sayelle, when dyed to deep shades with cationic dyes, can result in longer sweaters than when dyed to lighter shades with disperse dyes. In extreme cases, a difference of as much as 15 per cent can be obtained. In such cases, obviously there is also a difference in bulk.

One way to insure constant bulk for various shades obtained from cationic dyes is to hold constant the amount of cationic dye plus cationic retarder. Another way to obtain relatively deep dye shades and obtain high-bulk is to use cationic dyes and anionic retarders. Details of this procedure can be obtained from Du Pont's textile fibers technical service section in Wilmington.

Basic cause for this observation has been studied and been found to be directly dependent upon the effect of cationic materials on the crimp of Orlon Sayelle bi-component acrylic fiber Type 21. Cationic materials inhibit the crimp of the individual fiber, while chemicals such as disperse dyes do not. The observed change in sweater length has been related to the crimp product characteristic of the fiber. By using a crimp product, we combine both the crimp level and crimp amplitude of the fiber. Thus, we measure the number of kinks and their relative diameters. The higher number means a crimpier fiber. Thus, as the fiber crimp is decreased, a sweater will increase in length.

In review, it has been possible through process and equipment development to bring a bi-component acrylic fiber, Orlon Sayelle, to the commercialization stage. The fiber has been introduced initially for use in sweaters and hand knitting yarns. As additional textile technology is developed for using the fiber and as modifications are made to optimize its performance characteristics, the fiber is expected to find application in wool-like, knitted, and woven structures generally.

The bilateral acrylic fiber represents a basically new kind of acrylic fiber rather than a replacement for present Orlon acrylic staple Type 42. It combines the aesthetics and performance of Orlon with the liveliness and behavior of wool. This new product provides a new degree of freedom in the finishing of aesthetically pleasing fabrics from the growing family of Orlon.

It is obvious that this development has required installation of additional manufacturing facilities of a high degree of precision. The product, in initial commercial production, and its poundage will increase as the fiber finds its place in the market. The properties of the fiber, as well as the complexities of its manufacture, place it in the premium product class.

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NKOA Convention

Manufacturing Knit Dresses On Circular, Flat Machines

By THOMAS EDMAN
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Philadelphia College of Textiles and Science

THE fashion cycle in knitted dresses has returned again. I hope this popularity will stay with us for many years. The last major market period for knitted dresses was in the middle thirties. However, at that time we had only the natural fibers—wool, cotton and silk—to work with and we did not have the fiber technology of texturized and bulk yarns. The fabric of the time was heavy and loosely knitted, easily became baggy and grew longer each year with wear. The only finishing applied were fulling, brushing and felting shrinkage contol.

Knitted dresses in one-piece, two- and three-piece ensembles can be made on many types of knitting machines. The first one, the coordinates of full-fashioned sweater and a woven skirt, enjoyed popularity for many years, except that the trouble of hunting for a matching skirt by the customer is now assumed by the manufacturer. Full-fashioned outerwear equipment can be just as easily used to knit a skirt too, complementing the sweater or the blouse. This method of manufacturing has many advantages, especially when expensive yarns are used. The fabric is a plain jersey in light weight, knitted to the exact shape of the body on the machine. There is no yarn waste and the spring beard type of needle produces a more uniform quality fabric than the latch needle used in circular and flat machines. This is the only type of outerwear machine at the present time that can produce a figured intarsia design. The disadvantages are slow production and the ridiculously low price of foreign, specifically Japanese competition.

Another approach is the utilization of flat machines that can produce a very tight fabric with unlimited design possibilities. A dress was knitted by the knitting students of the Philadelphia College of Textiles and Science on a double lock dubied DL machine. It was knitted automatically in one piece with a rack design on the skirt, rib waist band, and high and low butt tuck design for the top. This method of manufacturing is suitable only for small volume, high quality and expensive garments, because the rate of production is very slow.

Similar fabrics can be knitted automatically on circular machines at a faster rate of production and with unlimited design potentials on Wildman-Jacquard and Ordnance Gauge machines. These fabrics can be classified as stitch shaped either in the seamless or cut method of making up, because with use of the proper stitch construction the fabric widths can be varied for the hip, waistband, and the bust. This dress fabric was made on an OTA machine, using high and low butts for pleated effects of the skirt and a combination of tuck, miss, and knit interlock and rib for the top of the garment. All the knitted fabrics illustrated so far are knitted by the strip method of manufacturing with draw threads between strips and self-edge welt which requires no turning of the hem on the bottom of the skirt. The

(*Continued on Page* 178*B*)

disadvantage of this type of dress manufacturing is the amount of cutting waste all too common to sweater production.

The biggest volume and largest rate of production growth has been achieved on the yard goods machines. In the last 15 years the output has grown five times and in 1960, there will be about 25 million pounds of knitted dress goods produced from plain jersey and rib machines to fancy pattern wheel, print, and jacquard design machines. The most popular construction is the pique type of knitted fabric manufactured by two methods. Some mills specialize in the knitting of the fabric only, similar to the weaving industry, and sell the yardgoods to a converter. These are the large volume producers such as Alamac, Princeton, Beaunit, Security. The second group of mills produce the knitted fabric and convert it to dresses themselves or by licensed contractors. The future development and growth of the knitted dress goods industry rests with this last group of mills, smaller in size but integrated from the yarn to the finished garment. The fabric can be engineered to suit the fashion. The same yarn used for the knitting of the yardgoods can be used for trimmings, and for sewing threads to get a perfect color match in the entire dress. In order to keep up sales appeal, nothing should be sacrificed to quality.

The last knitted dress manufacturing method is that of warp knitting. Both Tricot and Raschel machines can be used for the production of knitted outerwear fabrics. The warp knitted fabric has the closest resemblance to the appearance and characteristics of a woven fabric used for dresses. The Raschel machine especially with its coarser gauge and large number of guide bars is very suitable for knitted yardgoods fabric manufacturing. This dress was cut from a Raschel fabric, representing a very colorful and intricate stitch construction.

What women look for in a knitted dress is eye catching appeal, elegant styling, comfort of wear, ease in handling and packing for trips. The fabric has to have light weight, be knitted with a fine two ply yarn, and have a tight stitch construction to look just as fresh after washing or dry cleaning as on the racks of the retailer. In most cases it does not even need a lining, but supplying one with the dress eliminates the use of a slip, while still covering the outlines of the under-garments; and it will protect the knitted fabric from excessive stretch of the knees, seats and elbows.

Unfortunately, in our industry we often lose sight of a good opportunity within our reach. The knitted dressgoods market is a large and growing one, that can be developed and maintained. However, if we start out again on the top with a fairly profitable return for a good quality garment and then follow the usual one way steep hill downward, gradually cheapening the fabric, we will inevitably shorten the favorable fashion cycle that brought to the forefront the use of knitted dresses again.

NKOA Convention

Design Possibilities In Circular-Knit Jersey Fabrics

By VICTOR J. LOMBARDI
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THE striking theme of this convention, "New Frontiers for Knitwear and Swimwear," forcefully accentuates the knitting industry's expanding role in the broad field of textiles, and brings into sharp focus the challenge it must accept to keep pace with a fast moving technology. Knitted items of apparel continue their impressive strides forward, and are, in fact, having a stronger impact on the consumer market than at any time in years. One has only to stroll along the main streets of any city or town to note that knitted fashions are currently capturing more than their share of window display space. Indeed, our friends in the weaving trade are quite prepared to acknowledge that knitting poses a challenge to their operation, and not a few are fast coming to the realization that "if you can't fight them, join them".

There are obviously valid reasons for the enthusiastic acceptance of knitwear by the consumer just as there is justification by the weaving fraternity that knitting presently represents a threat in certain segments of their trade. Just what are some of the underlying considerations involved here? First, knitted fabrics can rightly be regarded as universal in character for they can be produced with desirable features of elasticity or stability in an infinite variety of surface textures and pattern effects. In some constructions, they bear strong similarity to the better types of woven goods, yet retaining the warmth, draping qualities, hand and eye-appeal characteristics of knitted fabric. Secondly, when compared to weaving, a knitting operation demonstrates impressive economies in capital expenditure. Thirdly, it is more flexible, more efficient, more productive than weaving, and lends itself to a more rapid translation of ideas, patterns, and textures into actual fabric. Weavers who have been forced to think of yarn and pattern changes in terms of days are quite understandably impressed when they are told these changes can be accomplished in minutes, as is often the case in knitting.

Before considering with you some of the design possibilities afforded in knitting, permit me to provide a framework by noting that my remarks will be limited to jersey machines of sinker top construction. Obviously, the most elementary form of design producible on this equipment is that of horizontal stripes achieved solely by the placement of yarns in any required order around the machine. The number of feeds on the unit is, of course, the limiting factor. This limitation can be overcome — but not without a decrease in the productive capacity of the machine—by the employment of yarn striping attachments at each of the yarn feeding stations for selective placement of color bands in the fabric. This is done through normal chain means, and it will be understood that with this most basic approach, no needle selection is involved. Recent developments in fiber and yarn technology, as well as the perfecting of new techniques in fabric finishing, have combined to enhance the surface interest and design possibilities of what was often referred to as "a plain piece of fabric". In this vein, the use of space-dyed yarns, improved methods of fabric printing, and the application of silicones, foams, etc., have contributed much to the design of plain jersey fabric, and have extended its utility and acceptance in many broad areas. Since plain fabric is self-color on the front and back, it can be worn with either side as the exposed surface. When a jersey fabric produced with worsted yarn is worn with its technical reverse side exposed, its appearance is greatly enhanced by a milling operation during its wet finishing process. This operation firms up the fabric and imparts to it more of a woven rather than a knitted look.

Design effects in single jersey fabrics can be produced on the technical face of the fabric, on the technical reverse side of the fabric, or on both. These can be produced in self-color or multicolor by means of needle loops, sinker loops, on a lay-in principle, or in various combinations of the above. Furthermore, they can be created by the continuous feeding of yarns throughout the coursewise extent of the fabric, or by the localized introduction of yarns to single needles, or to selected groups of needles.

Inasmuch as designing on the technical face of the fabric requires the raising of certain of the needles to a knit level, some means to create different positions of needle height are clearly indicated. Certainly among the most popular methods for selecting knitting instrumentali-

(*Continued on Page* 178C)

ties are pattern wheels. These come in a variety of constructions, and are designed to actuate sinkers, needles, or jacks. When mounted horizontally for selective actuation of the sinkers in producing loop cloth, they are driven by the sinkers themselves. Similarly, they can be mounted horizontally for selective engagement with jack elements located below the cylinder needles, thereby raising certain needles to the yarn receiving level. When thus mounted, gear means are usually provided to drive the wheels.

Positive Selection

In those instances where the pattern wheels themselves effect positive needle selection, they were designed earlier for two-position work—the so-called knit and welt construction permits a good amount of patterning on the face, makes for a clean delineation between the colors, but poses a serious limitation with respect to the spacing of the motif. Since the so-called effect yarn has to be carried as a float between the patterns in which it is made to appear, a six-needle float is normally considered the limit, but even this has created problems of snagging, etc.

The three-position wheel provides an admirable answer to the float problem, in that it makes possible the selective positioning of the needles in any of the three heights at a single feed and insures the tying-in of the floats in any desired arrangement. This development represents a milestone in broadening the pattern scope of sinker top machines. This is carried a step further by employing the three-position wheel in combination with four-color yarn changers and pattern placers. The pattern placers permit the selective neutralizing of the wheel readings by actuating raising cams to cause all needles to be lifted to knitting height irrespective of the initial pattern wheel selections. This makes it possible to incorporate designs automatically at predetermined positions coursewise of the fabric.

Although the pattern wheel has made a valuable contribution from the standpoint of needle and sinker selection, still, few technicians will argue convincingly that it does not have certain limitations. The problem of pattern spirality when the wheel is used to its maximum design potential is, in some instances, a drawback. A second shortcoming is the amount of time involved in changing over the wheels to produce different effects. I might add for the benefit of the non-knitters in the group that the setting of these wheels need not interfere appreciably with a machine's productive output since the work of preparing a second set of wheels can be accomplished while the unit is in operation. The replacing of the pattern wheels on the machine can be done in a relatively short time. Although some wheels used abroad incorporate discs with frangible bits and can, therefore, be stored in sets according to pattern, those most popularly employed in this country require dismantling of the pattern wheels and the relocation of the bits for each pattern change. This, heretofore, has been a hand operation, but fruitful efforts are being made to effect these changes in a mechanical way. There are pattern wheel setting units which are being offered by certain European machine manufacturers in connection with the sale of their units. These wheels are ingeniously designed to make possible this rapid setting, but have been limited to two-position needle selection. Paper controlled jacquard mechanisms, steel bands, or pattern drums represent design approaches which have eliminated the spirality factor and have facilitated the storing of patterns.

32-Stop Pattern Drum

Especially noteworthy of the new developments for broadening this patterning versatility of sinker top machines is a 26-inch, 64 feed, unit incorporating a 32-step pattern drum at each feed. The machine is unique in that it provides three-position needle selection at each feed. The pattern drums are manually adjustable to any of ten positions, thereby enabling the storing of ten distinct patterns on the machine. Design changes, readily made in a matter of minutes, are produced without spirality. By suitable configuration of the needle selecting jacks in the cylinder, patterns can be "wiped off" at predetermined locations walewise of the fabric.

I should like, finally, to invite your attention to another method for broadening the design potential of plain jersey machines. This relates to patterning on the reverse side of the fabric by the introduction of so-called lay-in or backing yarns. These yarns are fed to selected needles raised to tuck height by any of the aforementioned patterning devices. Inasmuch as the yarns are fed into the hooks of selectively tucked needles and behind the welted needles, they consequently do not form knitted loops, but rather are caught into the fabric between needle loops at predetermined positions. This makes possible patterning with the yarns floated behind the unselected needles. The effectiveness of this technique stems from the ability to introduce in the fabric a tremendous range of natural and synthetic effect yarns. These might be chenille, bouclé, knop, thick-thin, slub, and, in fact, the whole family of novelty yarns. These fabrics are characterized by exceptional stability, and by proper finishing, are in some constructions indistinguishable from woven fabrics.

Coursewise Designs

Design effects in jersey fabrics, for the most part, have heretofore been produced by a method of coursewise patterning. These have normally been achieved with yarn changers in combination with means for needle selection. Although many interesting effects are producible with this system, there is an inherent shortcoming in that it is necessary to carry the effect yarn throughout the fabric even though its contribution to the design might be in only isolated portions. This has imposed a considerable patterning restriction from the standpoint of bulk alone, inasmuch as fabric weight is frequently a function of the complexity of the fabric to be produced.

In addition, horizontal patterning is normally limited to four-color work, since four-finger stripers are usually employed to produce these design effects and I might add, at a sacrifice to the machine's productive capacity. Furthermore, horizontal patterning restricts the use of expensive effect yarns, since their indiscriminate introduction into the fabric contributes appreciably to its weight and cost. Finally, horizontal patterning, in view of the method by which effect yarns must be carried throughout the fabric, detract from the pattern definition which these yarns are intended to produce.

Wrap Patterns

The limitations inherent in this conventional system of patterning have led to the development of a new pattern wrap machine which offers the highest degree of design versatility yet available in equipment of sinker top construction. This unit enlarges the usual design possibilities by incorporating a system of walewise patterning—sometimes called vertical striping. Both the horizontal and vertical patterning are selectively and, therefore, independently operative through normal chain means. The ability to pattern up, down, and across permits virtually unlimited combinations of design, color and textures. Plaids, checks, vertical stripes, and many of the patterns which have formerly been considered in the private domain of the weavers are now readily producible with this development.

OTHER NKOA CONVENTION PAPERS

Because of space limitations and deadline requirements for this issue, several of the papers delivered at the NKOA convention on April 20 are not included in this special supplement. These will be published in a similar supplement in the May 1 issue. The papers include the following:

- A Study of the Processing Variable of Orlon in Turbo Stapler, by R. A. Wells of the DuPont Company
- Quality Control in Yarns and Knitting, by T. A. Podbereski, knitting mill consultant
- Marketing Strategy — Framework of Major Management Decisions, by Daniel L. Brier, Werner Textile Consultants

Knitting Techniques

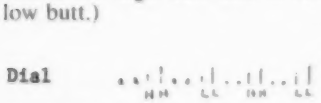
Producing Mesh Structures On An Interlock Machine

THE production of almost any kind of openwork on the basic of interlock knitting must involve a discontinuity of stitch intermeshing along certain wales on at least one side of the fabric. This result is most readily achieved by removing needles from certain cylinder and/or dial tricks, the mesh structure being then developed by combining cleared and tucked loops. The formation of holes is accounted for by stitch distortion.

One of the best known textures embodying this principle comprises a twelve feed interlock knitting sequence which is modified by tucking on the dial at six consecutive feeds, the needles in the dial being arranged 2 in, 2 out alternately. There being long needles in odd dial tricks, short needles in even dial tricks, short needles in odd cylinder tricks and long needles in even cylinder tricks, needles are removed from the dial without disturbing this arrangement. Long needles in cylinder and dial receive yarn at feeds 1, 3, 5, etc., and short needles in cylinder and dial receive yarn at feeds 2, 4, 6, etc. The tucking is done by needles that would otherwise knit.

Meshes of more open character developed by tucking require the use of dial needles with high and low butts working in conjunction with split or stepped dial clearing cams. By knitting on high butt needles and tucking on low butt needles it is possible to continue tucking to the places where holes are required to appear.

One of the most common mesh structures produced with high butt and low butt dial needles has the needle set-out given below. Long and short strokes denote long and short needles respectively, dots represent empty tricks and the letters H and L indicate the height of butts on the dial needles. (H stands for high butt and L for low butt.)



Within limits, the knitting action of the machine can be varied to suit the number of feeds available with any multiple of twelve feeds, for example, there can be a convenient repeat cycle in which long dial needles with low butts tuck at feeds 5, 7, 9 and 11, and short dial needles with low butts tuck at feeds 6, 8, 10 and 12. Long dial needles with high butts and long cylinder needles knit at every odd feed while short dial needles with high butts and short cylinder needles knit at every even feed. Long dial needles with low butts knit at feeds 1 and 3, and short dial needles with low butts knit at feeds 2 and 4.

Although the holes they contain are not large, as all-over effects in piece goods these mesh structures satisfy general trade requirements. Their use in sweater-strips, however, is often prevented by the need to produce them in one continuous length along with welt and ribbed end or borders.

Empty Tricks

The knitting of 1 x 1 rib does not preclude the possibility of leaving certain cylinder and dial tricks empty provided these tricks would otherwise contain needles that are not in action while the rib is being made. The essential condition for the production of a fast welt is that the yarn of the first course of each new garment piece shall lie around individual cylinder and dial needles alternately, which means in fact that unless the number of knitting needles is reduced to 25 per cent of the total possible number or the machine-turned welt is dispensed with, it is not possible to empty two tricks alongside each other in either cylinder or dial. Another necessary condition for the development of openwork effects is accumulation of tuck loops in certain wales for which facilities are not always available on sweater-strip machines.

While most multi-feed and super-multi-feed interlock sweater-strip machines, in the form in which they exist at the present time, impose serious restrictions in reference to the knitting of mesh structures other than as piece goods, the mesh structures specified above and many like them are producible in sweater-lengths complete with welt and 2 x 2 ribbed border on non-jacquard machines of the type of the Wildt-Mellor Bromley Model 4 RNDTS. This type of machine is not equipped with pattern wheels or other needle selecting mechanism but it has a double cam track in cam box and cam plate and utilizes four different kinds of cylinder needles and four different kinds of dial needles. The dial shogging mechanism enables fast welts to be knitted in conjunction with 2 x 2 rib borders and there is a transfer station at which, with the help of loop-expanding spreader housed in cylinder tricks along with the cylinder needles, loops can be transferred from cylinder to dial.

In the modern range of interlock sweater-strip machines there are also models such as the Wildman-Jacquard TJ1 12, Wildt-Mellor Bromley RTR 2, and Wildt-Mellor JTR, on which loop-transferring can take place from cylinder-to-dial and dial-to-cylinder as a means of changing character of stitch within a garment length, if necessary, and also from cylinder to dial for patterning purposes.

The significance of loop transferring in the context of this article is that it provides means for the production of interlock mesh structures without tucking and with the full complement of needles in action. The mesh structures can form part of garment lengths that have either 1 x 1 or 2 x 2 ribbed borders complete with welt.

Loop Transfer

The 32-inch JTR machine has 12 knitting feeds and six transfer stations; the TJ1, when adapted for loop transferring, has eight knitting feeds and four transfer stations; and the RTR 2 has four knitting feeds and two transfer stations. Hence, on all these machines, loops can be transferred from cylinder needles to adjacent dial needles at intervals of every two knitted courses.

Although the actual transference of a loop from a cylinder needle to a dial needle does not of itself cause a hole to appear in the fabric, there will be a hole in the same vertical line when the emptied needle is brought back into action. In the knitting of interlock mesh structures of the kind envisaged in this article each emptied needle receives yarn in the knitting section immediately following the transfer section in which it was emptied and a hole will therefore coincide in position with the transferred loop.

By arranging for all odd cylinder and even dial needles to receive yarn at knitting feeds 1, 3, 5, etc. and all even cylinder and odd dial needles to receive yarn at knitting feeds 2, 4, 6, etc., the construction of the fabric is made identical with that of ordinary interlock except that wale continuity is broken and holes are formed wherever cylinder needles transfer their loops to the dial.

Needle Selection

Selection of cylinder needles at transfer stations enables interlock openwork to be produced in which holes are distributed as a figure design, the scope for figure designing in this way being dependent upon the available type of needle selecting mechanism. In the case of the Wildman-Jacquard TJI-12 the patterning scope with punched paper is unlimited and although the possibilities of the multiple step mechanism of the RTR 2 and JTR machines are somewhat more restricted they are adequate for most purposes and can be made to lend themselves to adaptation to satisfy exceptional requirements by utilizing either geometric or free hand methods of patterning, or both, according to circumstances.

ASKT PAPERS

The full text of the papers to be presented at the seminar on outerwear, underwear and hosiery knitting of the American Society of Knitting Technologists on April 26, in Atlantic City, will appear in the May 1 issue in the form of a special supplement.

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Women's & Misses'

Knits Modeled At Symphony Benefit

BATON ROUGE, La. — A fashion show benefitting the symphony orchestra was held here recently under the joint sponsorship of the Baton Rouge Civic Symphony Women's Auxiliary and Rosenfield's House of Fashion.

Among the most popular items modeled were knitted suits and dresses. Glenn Gordon, buyer for the women's ready-to-wear in Rosenfield's, chose three garments by Cadillac and one by Promenade for the show. These particular garments were selected because of their adaptability to the Southern climate and also because they were practical for travel.

The three Cadillac ensembles were knitted of wool. A slim lined skirt, sleeveless pullover and a seven-button cardigan made up the first of two three-piece outfits. Here, the sole trim were gray ombre stripes along a turn back collar and large pockets on the cardigan.

The second three-piece outfit consisted of a sheath skirt, said to be textured against sag, a sleeveless navy blue top which was banded horizontally with pin stripes of antique brass and white and a six-button cardigan with large sailor collar. Brass and white stripes also decorated the collar and cardigan front of this outfit.

Also knitted by Cadillac was a navy blue sheath dress detailed with an inset V in white that plunged to the mid-section of the top.

The Promenade knit was a two-piece, all-wool outfit in shades of lilac and periwinkle.

Silk chiffon was effectively combined with knitted cashmere in an elegant evening dress. Layer upon layer of shocking pink silk chiffon formed the flowing skirt while the top was a matching scoop neck, short-sleeved cashmere sweater sequinned in petal pink.

Swimwear also formed a segment of the fashion show. Shown was a trim Rose Marie Reid suit that was all white with a tailored trim and a low cut back.

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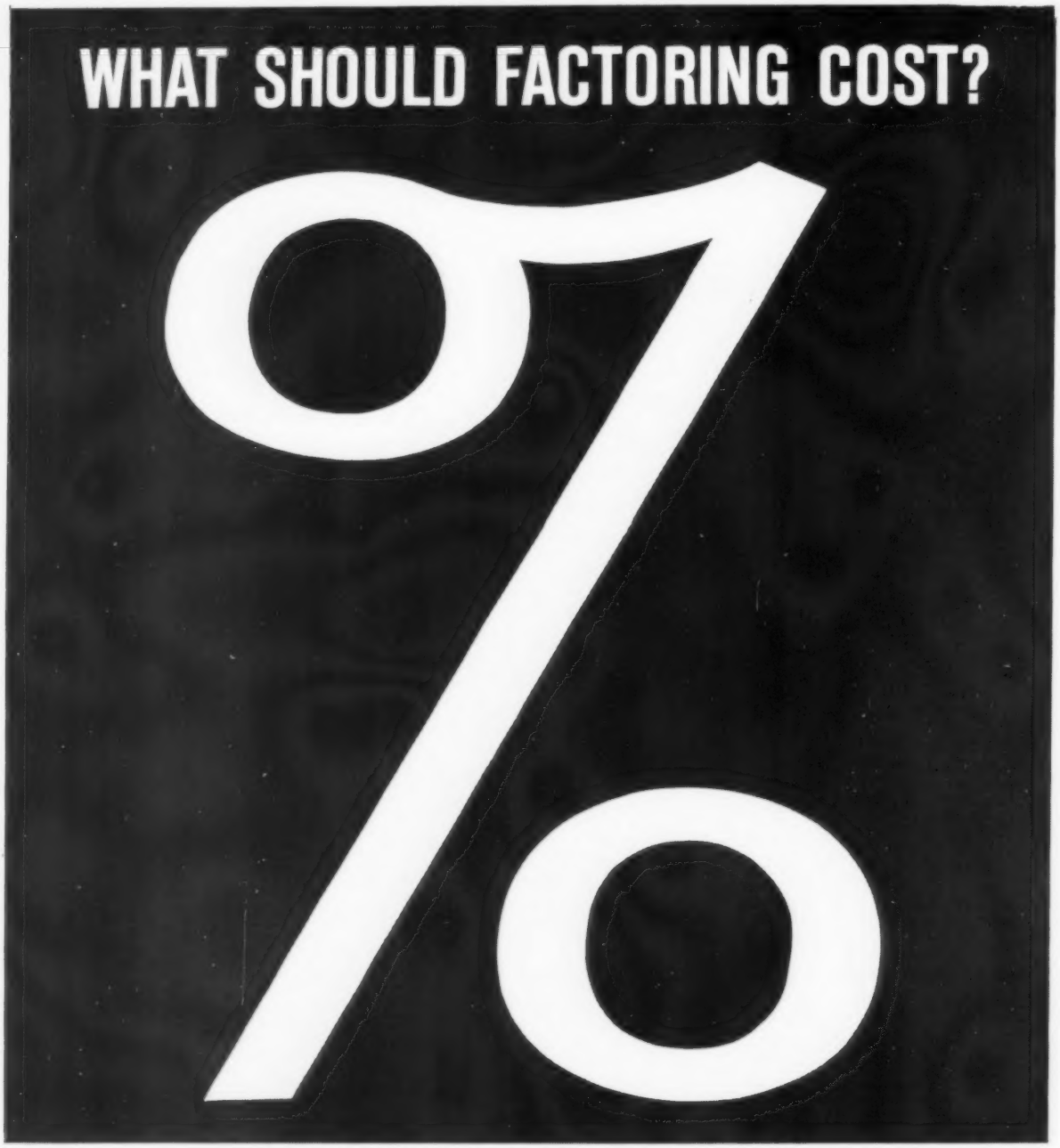

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Women's & Misses'

Golf Theme Is Used In Decorated Sweaters

Intended primarily for holiday and spring, a collection of decorated sweaters are an important segment of Darlene Knitwear's spring line. Knitted entirely of Orlon, these sweaters are divided into two groups. One includes delicately patterned numbers that are elegant accessories whereas the other centers around more tailored numbers highlighting activity themes.

For example, twisted gold rope and fabric flags are among the trimmings used to create a nautical theme, and grosgrain ribbon, gold, gold buttons and a felt applique are formed into golfing symbols that are scattered over the surface of another of these adorned numbers.

The more elegant of the decorated sweaters employ seed pearls, dainty ribbon and tiny pastel beads in the formation of flowered patterns, artistic beaded designs and edge trims.

Flowered themes are the most prevalent and are executed primarily in white and pastel ribbon, tiny pastel beads and seed pearls. Hand embroidery adds an elegant touch. Often, a flower from the body of a sweater will appear on the sleeve near the cuff or neckline, or several be found encircling the neckline.

An outstanding example of the flower theme is found on an all-white sweater with ribbon flowers placed atop hand-embroidered stems. Tiny beads add a delicate touch.

On either a navy blue or white sweater, white beads the size of seed pearls are formed into a beautiful design. Designs on other sweaters are made with multi-color beads and pearls.

These numbers are all full-fashioned, buttoned cardigans. It is possible to order most of them in either all white or a pastel with pastel decorations. Many of the sweaters will also be offered in navy blue, sure to be a very good color this spring.

One Chanel-type sweater, a full-fashioned Orlon, features a textured beaded trim around the neck and down the front. A beige sweater comes with beige and brown beads and a navy sweater with navy and white beads.

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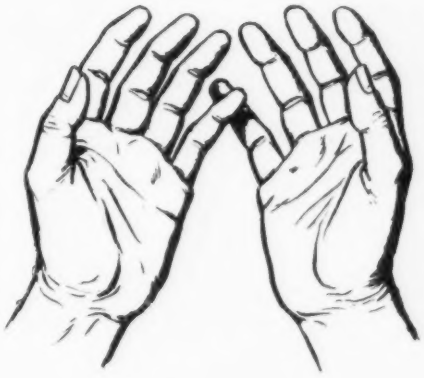

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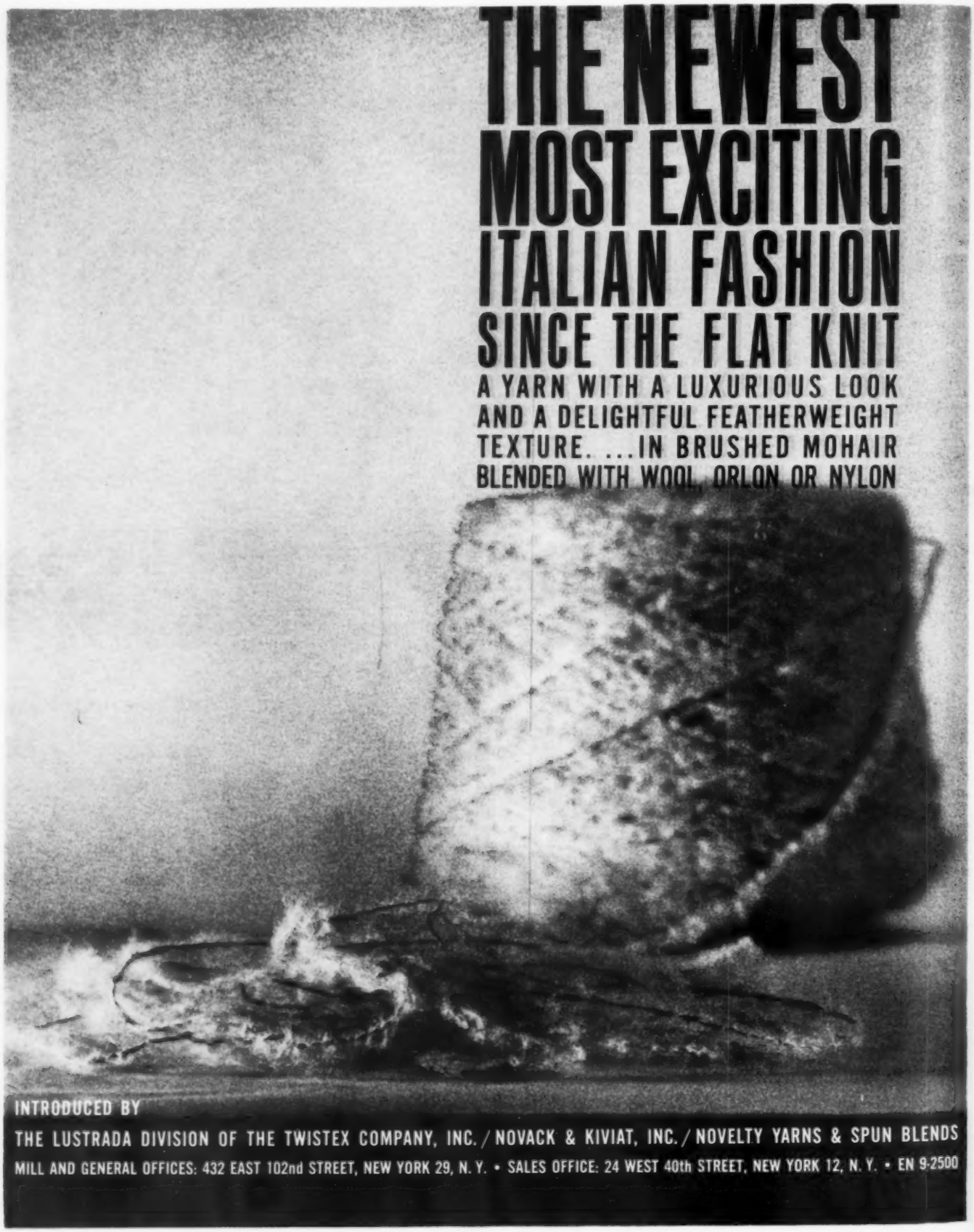
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Women's & Misses'

Far West Favors Chanel Influence, Gay Color Mixes

SAN FRANCISCO, Calif.—Sales were spotty at the summer market of the West Coast Salesmen's Association March 19-22.

Salesmen doing volume busines with the large stores or retailers in metropolitan areas reported that business was good. It appears to be the small Northern California shop in less populated areas that has been hurt most by the current business slowdown and this fact quite naturally was reflected in market week sales.

Among the styles favored by retailers, both flat and textured knits, were in demand. Chanel styling continued to be popular, particularly in flat knits. Gay colors in striking combinations as well as tone-on-tone trims were endorsed. Many firms spurred extra sales through the offering of extensive coordination possibilities.

At Bams Knits, Al Levine reported that he was getting a lot of action on a new shrug in a mock cable stitch. Made of Orlon to retail at $8.95, sizes 36-46, the best selling colors were white and blue.

Firm business, Mr. Levine indicated, was some 20 per cent ahead of last year. His company recently raised prices 25 cents on its $6.50 line of sweaters which means a $11.98 instead of $10.98 retail level. Stores buyers, he stated, were responding well to this, welcoming the extra mark-up while finding little consumer resistance to the rise.

Evan Goldenberg, Zado Goldenberg said that where there were fewer buyers than a year ago, the market was "about what they had expected." The firm's cotton knit T-shirts and pants were in demand, he noted. A leading number among these was a boat necked beachcomber striped T-shirt made to retail at $2.98, sizes small, medium, and large. It is offered in two interesting color combinations —lemon, orange, raspberry, and blue, lilac, avocado.

In sweaters, a 16-inch cardigan coat model of white Orlon trimmed in two tones of a color was popular Goldenberg style at $5.95 retail with beige and lilac the important trim colors. The firm, Mr. Goldenberg reported, is planning a promotion for fall on Orlon Sayelle which will be featured in all types of bulky sweaters

Direct mail, magazine ads, and retail promotions will be used.

A long line coat sweater of high bulk Orlon was a leading seller at Redwood City Knitting Mills where Sam Ostroff was the representative. With glove length sleeves and texture interest, the design retails for $12.95; white, light blue, lilac, and beige are the leading colors.

Buyers were also endorsing a Redwood City Knitting Mills coat sweater with band trim and a cutaway front. Interpreted in a rib stitch, it is made of Orlon and retails at $10.95; sizes, small, medium, large and extra large.

The company, Mr. Ostroff said, has recently cut its color offerings to eight "in order to catch up with orders" Originally 21 shades were presented; later this was reduced to 14 and now to eight. The market Mr. Ostroff classed as "very poor; no comparison with a year ago."

Lionel Traube, Snyder Brothers Knitting Mills and Lindner Brothers tagged the market as "fair—more than expected." He pointed out that comparative figures with the market of a year ago were misleading because of the fact that Easter was so early this year — almost three weeks ahead of the date in 1960.

From Snyder Brothers Knitting Mills, Mr. Traube indicated that the firm's one piece cowl necked dress with a tie belt highlighted with pom poms was being very well received as offered in a blend of linen and Orlon. The same style has been a leading seller in all wool boucle.

Color coordination was the keynote at Lawrence Knitwear Co. where Robert S. Lea was the representative. Offering 18 dyed-to-match colors, the firm was stressing to buyers the importance of mutilple sales and the added business possible through the selling of an en-

(*Continued on Page* 187)

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semble rather than just a sweater.

A very unusual item — a bulky sweater of angora—was finding favor with buyers, Mr. Lea indicated. The collared cardigan is made to retail for $18.95. In color, sugar plum, a deep muted purple, is replacing violet in high fashion specialty stores.

Lofties Numbers

Tone on tone was effectively used in a flat knit Lofties design by Lawrence Knitwear. The top half of the easy fitting jacket is a light color, the bottom half a darker shade. This same color interpretation is repeated in the top of the accompanying sleeveless sheath dress.

A three piece Chanel-inspired outfit with contrast stripe trim at the hem and above the four pockets of the jacket was also popular at $69.95 retail. Among tapestry knits a leading number, according to Mr. Lea, featured a slim skirt topped by a cowl necked overblouse which could be worn belted or unbelted ($39.95 retail).

Ed Baker, Edith of California, indicated he was doing well with the flat knits recently added to the firm's line. Specializing in cotton, the company was finding good acceptance for its brightly young sportswear and dresses, many with wonderfully imaginative embroidery trim. Knee capper length pants were in demand with one leading number in this group having pockets at the hem and being trimmed with gay embroidered roses. At $12.98 retail, a two piece dress with a lined slim skirt, sleeveless scoop necked top and spaghetti tie belt was being endorsed with white and blue the best colors.

Edith of California

In a homespun knit surface, a group of solid color styles were coordinated by Edith of California with a yarn dyed stripe. Helio, blue, red and lemon, all with white,, are the leading shades. A Tiffany Knit from Sports Limited of Montreal, taking its inspiration from Chanel is a double-knit jersey with checked overblouse. The check trims the collar and pocket flat and lines the front of the solid color jacket.

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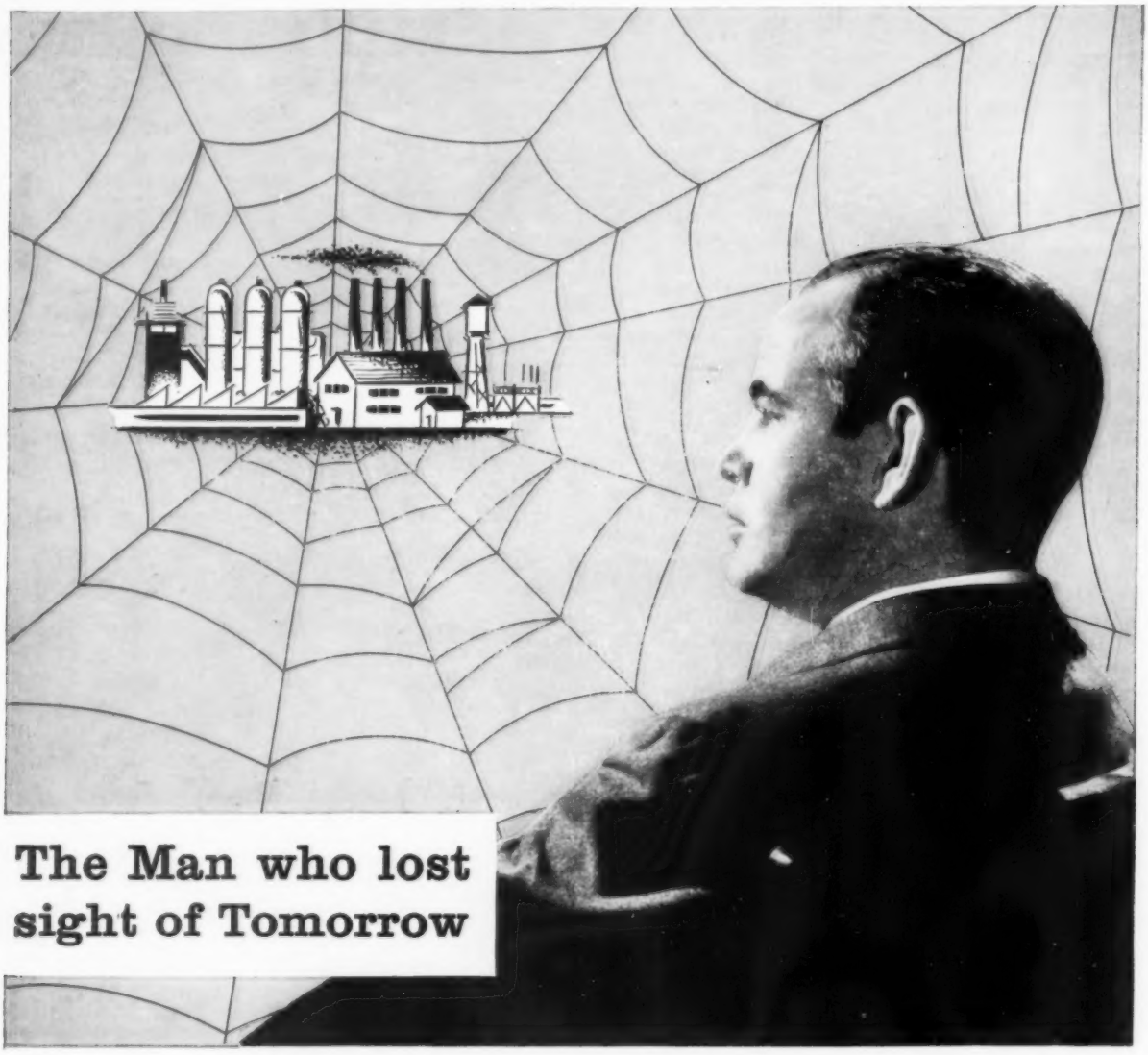

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Mill News

Utah Firm Makes School Sweaters

OGDEN, Utah — Coleman Knitting Mills, Inc., has built up a reputation as manufacturers of sweaters with high school and college emblems. These sweaters are custom-made, sold wholesale or directly to the schools. In the Ogden area they go direct to the retail sports stores.

In eight years of operation, production has been increasing steadily. In the last three years it has tripled.

The average weekly production is 190 to 225 garments. Through September and in the spring the average is 200 sweaters and 50 award jackets.

In 1960 the gross yearly sale was $135,000. William Coleman, president, has ordered $5,000 worth of new machinery to be delivered when he finds a new location, which he hopes to do this year.

Seventy-seven percent of the mill's production is sold out of state, to Texas, Arizona and New Mexico. The sweaters are made of the best worsted 100 percent wool yarn in 4, 6, 8, and 10 ply purchased from a Cleveland firm.

The largest sale is in cardigans. Most have appliqued a high school or college insignia or letter, or a club or fraternity crest. These are of embroidered chenille, done by machine with hand finishing. Sixty percent of the orders are for white sweaters.

The prices which depends on the play averages, $17.50 wholesale. The garments are guaranteed not to shrink or stretch if dry cleaned only. The name of the owner of the sweater is woven in the Coleman label at the back of the neck.

Coleman's award jackets are custom-made of top quality wool melton with a rayon lining. The sleeves, in raglan style are waterproofed leather. The wholesale price is $18.50.

The machinery and workers are at present in one large room. Mr. Coleman's small office and the shipping area are in front. The finishers and sewers are next with knittnig machines in the center of the room, flanked

(*Continued on Page* 191)

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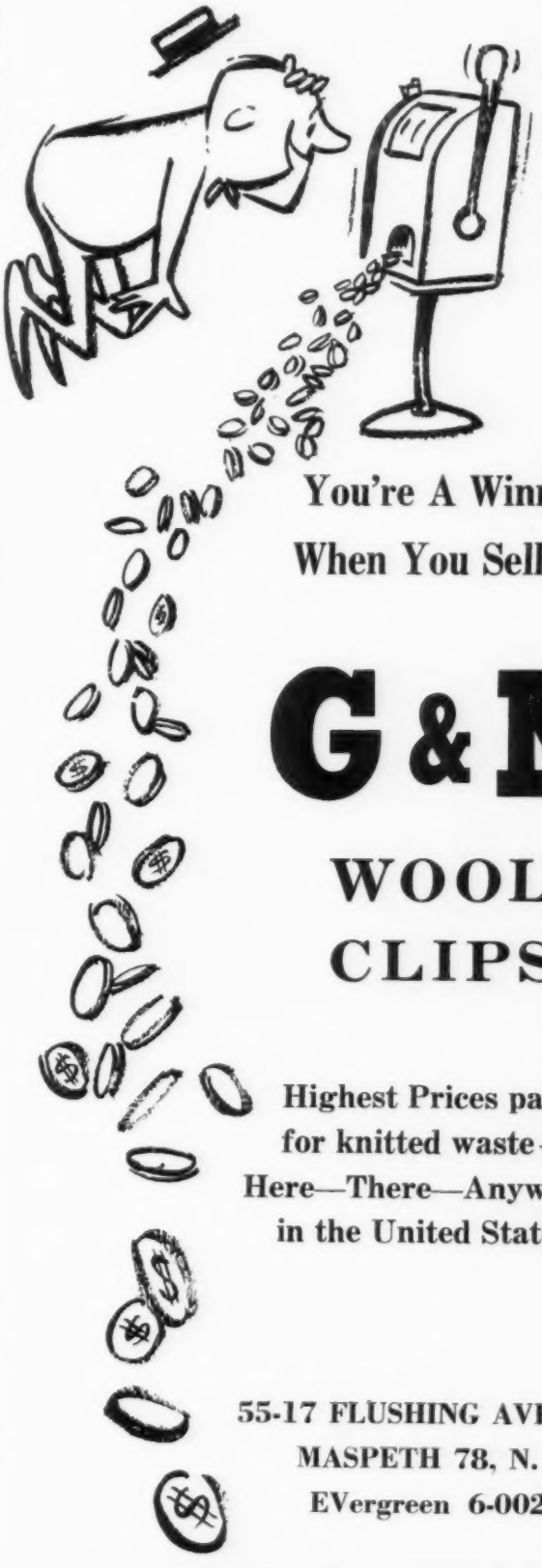

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on the right by the chenille embroidery machines.

Machinery is kept up to date. As soon as a new and improved model comes out, it replaces the old one.

There are six Dubied knitting machines imported from Switzerland. In Mr. Coleman's opinion they are the most versatile machines for sweater work. All are fully automatic.

The 15 power machines are Singers, for overedging, covering, hemming, plain sewing and buttonholing and sewing on buttons.

When orders arrive they are entered in the books. Mr. Coleman keeps paper work at a minimum. Instruction tags for each garmet, giving size ply, threads, length of sleeve, are made out by Mr. Coleman, who gives them to knitters; then are passed to cutters, sewers finishers and embroiderers for emblems.

The cutting is not done in layers as in some mills. One garment at a time is cut by the electric hand cutter. Patterns are made of plywood instead of paper to prevent slipping. From the cutters the pieces go to the sewers. Each woman has an assigned part: seams, collars, sleeves, facing, pockets, etc. The garment, after going to the finisher is carefully inspected, pressed and hung on the racks, ready for packing and shipping.

Mr. Coleman emigrated from England when was was fourteen years old and became an American citizen. He is a graduate mining engineer and a textile and production engineer.

Utah Lady Runs A Doughty Mill

OGDEN, Utah — The Intermountain Knitting Mill, with its tradename, Jedwin's, was until January, 1960, one of the oldest knitting mills in continuous operation, maker of women's customed tailored garments.

During the past year, the firm has switched to men's knitted sportswear — knit jackets, vests and shirts in boucles, jerseys, laminated knit with plastic backing, and vests in corduroy and velveteen. The garments retail from $5.95 to $22.95.

The vests were in such demand for Christmas that the mill was unable to re-fill orders telephoned and wired.

In 1927, Jedwin Nelson, and his wife Ruth established their mill in Ogden in the basement of their home with four sewing machines and women operators recruited from the neighborhood. As business grew, the Nelsons rented a vacant former laundry building and in 1933 they bought their present site and erected their own building where they still operate. When Mr. Nelson died in 1941, Mrs. Nelson became president and manager of the company.

13,000 Square Feet

The white, one-story building has 13,000 square feet of floor space, housing the general office, office of present manager, Darrell Curto, a son-in-law of Mrs. Nelson; the knitting room, steam room, sewing room, packing and mailing. There are 20 full time employees in the mill with one man part-days in packing and shipping; the manager and his secretary, two cutters, 14 sewing women, one steamer and one knitter. There are five salesmen in the field; four covering the territory from Denver to California and the West Coast and one who lives in Chicago, handling that area and Michigan.

Mr. Curto takes care of sales direct to retail stores in the Ogden area. He came to work for Jedwin's from college 12 years ago.

There are seven automatic machines in the knitting room: two Stafford-Holts, three Britons, a Supremen and a Jacquard.

Jay Crandall, who has been knitting for Jedwin's since 1934, designs the stitch patterns.

In the cutting room, the cutter and her assistant, manipulate by hand the automatic electric cutter.

The pieces go to the sewing room where each operator works on one part of the garment only: sleeves, front, sides, finishing.

A Running Inventory

Jedwin's keeps a running inventory, making it unnecessary to take one at the end of the year.

The mill has seen difficult times. A fire in 1953 that burned the machines and over three tons of yarn almost put them out of business. Faulty wiring in the mill's time clock set off the fire sometime during the night and

(*Continued on Page* 193)

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- NO stitch shows on right side of garment
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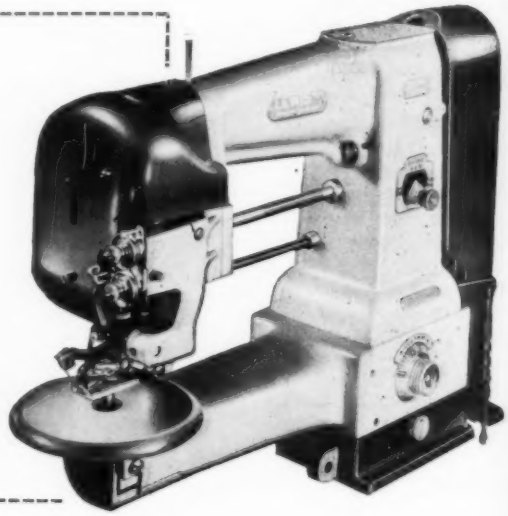
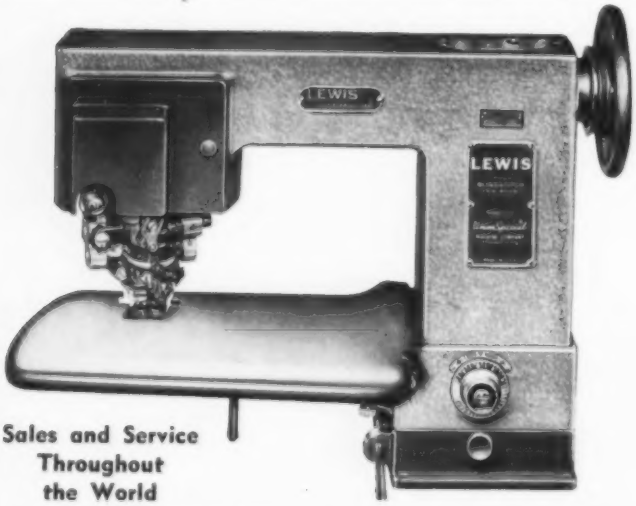


Union Special LEWIS STYLE 160-20 BLINDSTITCH TACKING MACHINE



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for all types of **KNITWEAR**
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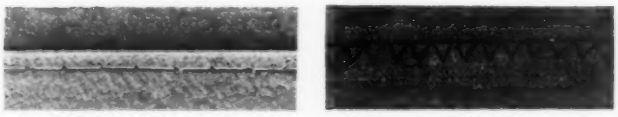

Makes a straight stitch . . . or an overcast stitch

FINEST QUALITY

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New York Office for Lewis Machines — 315 WEST 35th STREET, NEW YORK 1

it burned undetected for some hours. Ruth Nelson was faced with an $85,000 loss, a gutted mill, no yarn, burned machines and orders to fill.

Her employees reported at the mill in overalls, with shovels, brooms and scrapers, ready to help. She had the telephone company string up emergency wires in the midst of the debris and she got to work telephoning to New York to her source of supplies. Her credit was good. The source would make special shipments. She was still in business. It took the insurance company three months to rebuild the plant.

Bust Was A Boon

Oddly enough, the depression years brought Jedwin's their largest volume of business: over half-million dollars worth of: made-to-measure, custom knit suits and dresses directly to women in their homes. The firm had 175 salesmen on the road and 300 employees. They trained their salesmen in the technique of measuring and selling. Work was on a commission basis only but the men made good incomes.

During the war, Mrs. Nelson flew to Washington, D. C., and came home with authorization to produce custom-made uniforms for the officers of the Nurses 9th Army Corps area and was given priority on materials and supplies. Their uniforms were shipped all over the world.

Obituaries

Clarence L. Meyers, 75, Yarn Co. Chairman

PHILADELPHIA, Pa.—Clarence L. Meyers, 75 founder and chairman of Clarence L. Meyers & Co., Inc., Cotton and Synthetic yarn producers, died April 5 in Miami Beach. He was a founder and former director of the Durene Association, producers of mercerized yarns.

Survivors include his brother, Milton, who is president of the company, a daughter and a sister.

Archie E. Tanner; Was Figel Mill Executive

ALBANY, N. Y—Archie E. Tanner, vice president and treasurer of the Figel Knitting Mill, died March 24.

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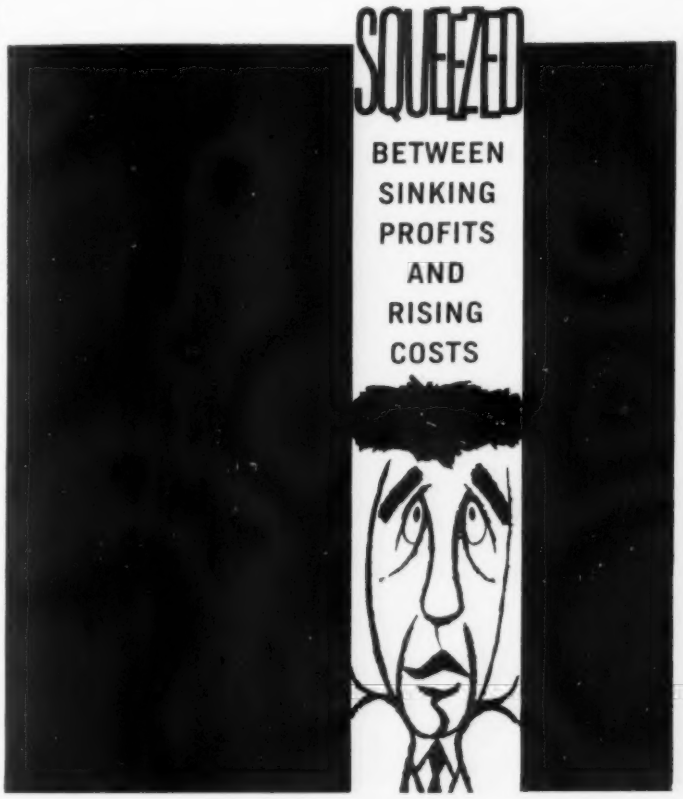

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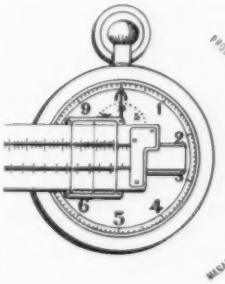

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Knitwear Abroad

Cashmere Booms For Scotch Knitter

GLASGOW, Scotland (via Scottish Amalgamated Trade News Agency) — Cashmere prospects for the autumn emphasize the trend towards dressy designs, with correlation an increasingly important feature. This is particularly evident in designs intended for the export markets, where the Scottish cashmere sweater is regarded as a more normal item than at home.

The American market, in particular, is still taking very considerable quantities of Scottish cashmere, and designs for this market indicate the trend of events. Longer straight-line sweaters, falling casually from shoulder to hip-bone are prominent, giving scope for belted or straight use, as the owner desires. Bloused effects are being produced by most houses, with the belt an optional feature. The main interest remains at the neckline, however. If anything, necks are more elaborate than ever and, although the V-neck remains a strong feature, notched collar-lines, long slit necklines, and looped necklines caught by button-tabs are all included. Scooped evening necklines have been featured by several designers, to allow extended evening use of cashmere, and on such garments three-quarter length sleeves are featured to allow full presentation of bracelets.

The coordinated look is demonstrated in matching sweater and skirt outfits, again aimed at extending the knitwear trade in export fields. These designs include two-color ensembles, the main color being supplemented by a second color in the collar effect and, to some extent, on the skirt, where inset contrasting panels of the second shade are featured.

There is a strong feeling in the cashmere trade that related garments will take increasing importance in the coming Winter and that Saxony or Cheviot skirts will be teamed up with cashmere tops, colors being related to give complete harmony to the outfit. Skirts have been normally in nine- to ten-ounce or in 12-ounce Cheviot. Some heavier cloths, at 14-ounces, have been currently developed for outdoor wear, replacing the lighter-weight fabrics used for indoor skirts.

The color pattern is always difficult to forecast, but there is a considerable showing of reds in the autumn pattern. These vary from very bright to very deep, each given individual names according to the manufacturer. Black cashmere is still immensely popular for evening wear, while rose pink, a variety of soft greens, and the delicate pastel shades are all being produced. In planning for the North American market, Scottish cashmere manufacturers have taken into account the machining themes dominating marketing, and are teaming their knitwear and tweeds with handbags, shoes and jewelry trends indicated in that market.

Demand for cashmere is, incidentally, as strong as ever, and Scottish firms in the high-fashion field are very fully booked for the autumn and are now busy on 1962 designs.

In addition to cashmeres, Shetlands are maintaining their importance, and present indications are that Shetland garments will take a substantial share of the Autumn buying. In some cases, these are 100 per cent Shetland, but a 25 per cent mohair mixture is not unusual.

While the export emphasis is still very much on these finer fibers, a considerable output of lamb's wool garments and a number of botany items are also being produced for the American market and have moved very satisfactorily.

Printed cashmeres have had a reasonable degree of success, although fewer have been seen in use than was anticipated when such designs were first launched. The present Autumn range of printed cashmeres includes a number of more elaborate designs, including Paisley pattern stylings, which extend the earlier floral prints in knitted wear. It is still uncertain how far this trend will develop. Certainly, for home trade, the impact has been relatively limited.

The classic twin-set continues very much as the bread and butter outfit, despite the tremendous growth of the dressmaker styles. For the Autumn, a new version of the twin-set will be available.

STONEHILL Has Accomplished Another Revolutionary FIRST!

So that we can DEMONSTRATE our most SENSATIONAL knitting machine achievement

WE'VE FLOWN IN via Seabord & Western Air Freight

completely assembled and ready to run

UNIVERSAL'S Brand New — Full Automatic — High Speed — Flat Rib FULL-FASHIONED MACHINE

So spectacular . . . we urge progressive knitting mill executives to be among the first to climb aboard our full-fashioned band wagon.

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LOOK AT THESE SPECIAL FEATURES:

- **WIDENING AND NARROWING**
  with automatic decking
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- CAN MAKE FULL-FASHIONED COLLARS, FULL-FASHIONED SWEATERS, FULL-FASHIONED TRIMMINGS—ALL AUTOMATICALLY
- 4-CARRIER BARS
- Incorporating all the characteristics of UNIVERSAL'S full automatic flat knitting machine design

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For Sale or Lease

Will sell at fraction of original cost or will lease at very attractive terms. Opportunity to start immediate operations. Present experienced help and management may be retained.

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25,000 Sq. Feet of Manufacturing Space.

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FOR SALE

1—PHILA. JACQ. "AI" Interlock body, 32", 32 feed, 17 cut, motor dr.

2—PHILA. JACQ. "LHB" 30", L & L, 4 cut, 6 fd., 6-3 color stripers, motor dr.

2—PHILA. JACQ. TJI-12, 30", Jacq. Trans. 12 fd., 1-9 ¾ cut, 1-10½ cut, 12-4 color stripers, motor dr.

3—PHILA. JACQ. TJ-6 feed, Jacq. Trans. 28", 1-8 cut, 2-9½ cut, 4 col. stripers.

1—PHILA. JACQ. TAI-12 feed, 30", Trans. & Interlock, (Rib Type) 14 cut, 12-14 color stripers, motor dr.

6—PHILA. JACQ. TA-24 feed, Transfer (Rib Type 32", 1-6½ cut, 1-7½ cut, 1-11-¾ cut, 1-12½ cut, 2-16½ cut, motor dr.

2—PHILA. JACQ. TA-4 feed, Transfer (Rib type) 1-15", 10½ cut, 1-16", 12 cut, 4 color stripers.

1—PHILA. JACQ. TA-8 feed, Transfer (Rib type) 20", 11 cut, 4 color stripers

2—PHILA. JACQ. MLW, yard goods, 28", 11 cut, 24 fd., wheels, 12 feed, jacq. cards (PR type)

2—PHILA. JACQ. MLW, yard goods, 28", 1-11 cut, 1-16 cut, 24 fd., wheels, 12 fd. jacq. cards (PR type)

1—PHILA. JACQ. (Rib Type) 28", 11 cut, 6 fd., 2 color stripers, L & S butt

2—LEIGHTON TRANS. 4 fd., 1-15", 1-17", 12 cut, extra 9 cut Cyl. & dial, Brush. attach., 2 color stripers

3—BRINTON SINKER TOP JERSEY, 24", 16 fd., 16 cut, 2 position pattern wheels

1—BRINTON SINKER TOP JERSEY, 36", 32 fd., 10 cut, 2 pos. pat. wheels, motor dr.

2—UNIVERSAL BACKWINDERS, Model 50L, 6 spindles each

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Sales Representative for WILDMAN-JACQUARD COMPANY

Mr. Forstadt will be at Booth No. 147 at the Knitting Arts Exhibition

FOR SALE

12—96", 7 cut Rabac double jack flat knitting machines, set up on cable,. 9 needle rack

3—65", 5 cut Universal MCI machines

BOX 172

FOR SALE — SURPLUS MACHINERY

Priced for immediate sale

2—Leighton, 24", 6 feed, 10 cut, 3 needle rack
2—Edmos, 17", 25 feed, 10 and 12 cut
1—6 head Trim-Master with turbine
1—60" Kastrinsky calender, folding table and rollers
1—36" CRA electric spreading machine
6—S&H machines; 19", 20", 22", 24", 26" and 30", 8 and 10 cuts. (Will sell these six machines for the price of the cylinders)
10 Sets—Wildman and S&H cylinders and dials; 7, 8, 10 and 11 cuts, 19" to 30" diameter
5 sets—Leighton cylinders and split plates; 4-15", 6½, 10, 11 and 12 cuts and 1-14", 8 cut
2—2½ gauge flat power, 4 bars, F.A. and 1—34", 1—25" electric stop-motion, perfect condition.

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1—Supreme BRW, 4 Cut, 30", 16 Feed
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2—O.G. Interlock Mach., 30", 4½ & 14 Cut, 12 Feed
2—Phila. Jacq. TJ, 16" 7 Cut, 4 Feed, 4 Col Strip
4—Phila. Jacquard TAI Machs., 12, 13, 13½, 16½ Cut, 30", 12 Feed
4—Phila. Jacquard TA Mach., 10, 11, 12, 13 Cut, 30", 12 Feed
1—Philadelphia Jacquard MLW, 28", 11 Cut, 24 Feed, Wheels and Jacquards
10—Phila. Jacquard TA Machs., 11" thru 19", 6 thru 12 Cut, 4 Feed
1—O. G. Multi-Feed Jersey, 1x1 Rib, 8 Cut, 36 Feed, 32"
3—Leighton Machs., 22", 26", 28", 10 Cut, 6 Feed
2—Wildman PB2 Mach., 17", 18", 8 Cut
7—Wildman Interlock Mach., 10 Cut, 19", 21", 22", 23", 20 Feed
2—Queens Model B Machs., 60", 9, & 12 Cut, High & Low Jacks
3—Dubied CAL Machs., 67" & 74", 7 & 8 Cut, double jack
1—Universal Supramat, 12 cut, 62", like new
1—Dubied BAN Mach., 56", 12 Cut, Jacquards Front & Back
3—Dubied, Single & Double Lock, 22", 7 & 12 Cut, 22", 44", & 47", 4 Bar
1—Lamb Doublehead Border Machine, 7 Cut
1—Universal Border Machine, 12 Cut, like new
6—Huebsch & Cissel Tumbler Dryers
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2—TJ, 28", 6 feed, 8 cut.
2—LH, 30", 6 feed, 8 cut.
4—LH, 30", 6 feed, 7, 8 cut.
1—LA, 15", 4 feed, 8 cut, 372 needles.
3—Card Punching Machines, 1—36; 1—44, 1—70, Levers.
1—TA, 15", 4 feed, 11 cut.
4—TAI, 30", 12 feed, 10 cut, 13 cut, 16½ cut.
2—12½ cut, 2, 13 cut.

DUBIED MACHINES

1—VV, 18", 11 cut, full automatic.
1—VD, 44", 10 cut, full automatic.
1—36", 5 cut, 4 bar.
1—48", 5 cut, 4 bar.
2—60", 10 and 12 cut BARB, one practically new.

WILDMAN MACHINES

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2—PB2, 1, 17", 1, 18", 11 cut.
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3—Ribbers, 17", 18", and 20", 12 feeders, 10 cut.
6—Ribbers, 2½", and 2¾", 2 feed each, 64 needles.
1—Jersey, 1¼", 40 needle.

BRINTON MACHINES

1—26", 24 feed, 1320 cylinder with tuck bars, and 12—4 color stripers.
1—TW, 24", 8 feed, 1080 needles, trick wheels.
1—21", 8 feed, 840 needles.
2—18", 16 feed, 564 needles with wheels.
2—18", 16 feed, 8 cut, 454 needles with wheels.
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2—8", 8 feed, 228 needles, with stripers.

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1—3⅜, 2 feed, 69 needles, S&R.
1—18", 7 cut, 3 needle rack, 3 color striper, 2 feed.

C & F MACHINES

3—40", 5 cut, 4 bar each, F.A.
1—24", 8 cut, 4 bar, F.A.

HAND MACHINES

1—Dubied Model MR 40", 12 cut.
2—Dubied 26" each, 5 cut.
2—Diamond 24" each, 5 cut.
1—C&F Powp wien, 32", 4 cut.
1—C&F, 24", 4 cut.
1—Grosser, 32", 5 cut.
6—Grosser, 22", 24", 26", 40", 7 and 8 cut.
1—Grosser, 40", 5 cut.
1—Grosser, 26", 12 cut.

SUPREME JERSEY MACHINES

2—20", 20 cut, 64 feed, Model MJ.
2—20", 22 cut, 64 feed, Model MJ.

ROBACZYNSKI MACHINES

1—76", 7 cut, Double Jack, L&L.
1—78", 7 cut, Double Jack, L&L.

LOOPING EQUIPMENT

15—All Types of Looping Tables.
2—Sotco Model "P" Loopers, 12 pt.
3—Sotco Model "P" Loopers, 14 pt.
1—Sotco Looper, 4 pt.
2—Sotco Loopers, 5 pt.
2—Sotco Loopers, 6 pt.
2—Sotco Loopers, 7 pt.
6—Sotco Loopers, 8 pt.
3—Sotco Loopers, 9 pt.
10—Sotco Loopers, 10 pt.

STAFFORD & HOLT MACHINES

1—32", 8 cut.
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1—30", 7 cut, 8 feed, PA.
1—24", 10 cut, 8 feed, PA.
1—22", 7 cut, 6 feed, PA.
1—18", 7 cut, 6 feed, PA.
1—22", 6 cut, 8 feed, Ribber.
1—20", 8 cut, 8 feed, Ribber.
1—21", 10 cut, 6 feed, Jersey Striper.
1—19", 10 cut, 8 feed, Jersey Striper.
1—19", 6 cut, 6 feed, Jersey Striper.

MISCELLANEOUS MACHINES

1—Universal skein to cone winder, Model 60 GF, 68 spindle.
3—Universal, 3 cut, flat machines, practically new.
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1—Kastrinsky Calendering Machine, 54".
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1—Grosser Machine, 40", 8 cut, 4 bar, F.A. Supreme att., with motor.
1—Grosser Machine, 24", 8 cut, 3 bar, F.A. Miskoff att.
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1—Grosser Machine, 44", 10 cut, 4 bar F.A.
1—Ordnance Gauge, model OT, 24", 8 feed, 10 cut.
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Many other items too numerous to mention.

TIME PAYMENTS CAN BE ARRANGED ON ANY EQUIPMENT

WANTED

Philip or S&W multi-feed interlock machines, approximately 1740 needles. Also cylinders and dials for TAI 30" and LH 30" machines, approximately 650 needles.

BOX 160AA

FOR IMMEDIATE SALE

7 — Universal flat machines, 4 cut. Excellent condition. Latest models.

BOX 160Y

CONTRACT WORK, CONTRACTORS WANTED

MACHINERY WANTED

TAI's, 13½ and 14 cut, and AI's, 13½ and 14 cut

Call HYacinth 1-2300

MEN'S AND BOYS' BAN-LON® SHIRT MILL WANTED

Mill representative requires an experienced quality mill currently manufacturing Ban-Lon® shirts and licensed for Ban-Lon® label. Must be able to supply complete product including yarn to large chains.

BOX 178

FOR SALE

1—30", 24 feed, 16 cut, Dubied Wevenit machine

2—29", 12 feed, 16 cut, Dubied Wevenit machines

1—30", 24 feed, 14 cut, Dubied Wevenit machine

BOX 173

FOR SALE

2—8 cut, 30" LH machines

1—7 cut, 45" flat hand machine

1—7 cut, 26" V-bed machine

1—8 cut card punching machine

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A personal meeting will be arranged at your convenience.

All replies will be held strictly confidential.

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New Improved Electric Stop-Motions for All Makes of Knitting Machines

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We have in stock, at all times, worsted, zephyr & Orlon, in all colors and sizes, on cones,
FOR IMMEDIATE DELIVERY

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WANTED . . . ORLON YARNS

Large quantity natural colors . . . 1/24 to 1/34 or equivalent in cotton count at closeout prices. Send samples, stock list and prices.

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Worsted, cotton and synthetic wanted for EXPORT MARKET. Would consider yard goods for lamination. Excellent opportunity to develop a steady and substantial business.

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CONTRACTOR WANTED
FOR BETTER KNITTED SPORTSWEAR AND SUITS

Motor, Merrow, Looping and specials necessary for leading important knitwear manufacturer. Metropolitan New York area only.

BOX 170E

CONTRACTOR SEEKS ADDITIONAL WORK

on bulky sweaters: ladies' sizes 34-40, men's and boys', children's sizes 7-14.

BOX 150C

KNITTED FABRICS MANUFACTURER WANTED

to make motor fabrics for leading knitwear manufacturer.

BOX 170G

WANTED — COMMISSION KNITTING

on 28-cut circular knitting machines. Complete knitting, dyeing, and finishing available. We have space for additional knitting machines.

BOX 176

CONTRACT WORK WANTED

All types of sweaters on 4 cut flat machines. Also fine gauge novelties.

BOX 170A

CONTRACTOR SEEKS WORK

Open for additional 200 dozen a week on 8 cut circulars.

BOX 171

CONTRACT WORK WANTED

on 4 cut Universals. Up to 6,000 pounds per week.

Call HYacinth 1-2300

CONTRACTORS WANTED

with 6, 7 and 8 cut circular links machines for ladies' sweaters.

BOX 177

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EXPERIENCED WOOLEN YARN
SALESMAN WANTED
For Pennsylvania Territory

Other yarns involved.

Old established company.

Our organization knows of this ad.

BOX 160F

KNITTER MECHANIC WANTED

on interlock TJI's, Supreme, etc.

BOX 175

WANTED — YARN MAN

One of the larger sweater mills in the Philadelphia area has an opening for an expert yarn man with experience in handling a large yarn department, and knowledge of controlling yields and smooth flow of yarns through the plant. Can have a permanent position and an excellent opportunity in our organization. Please give complete details of your background and experience in first letter. All replies held in strict confidence.

BOX 150J

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SUCCESSFUL KNITWEAR PRODUCTION
EXECUTIVE AVAILABLE

Background of proven success — producing garments for well known brand distributors of Knitted Outerwear. Can handle operation from yarn to box. Knowledge of various types of knitting machines and allied equipment.

Will entertain proposition with or without investment. Willing to settle permanently on Pacific Coast or Midwestern States.

BOX 142

DESIGNER

experienced creating original effects in knitting, styling and color blending.

AVAILABLE

BOX 170J

MANAGER-FOREMAN SEEKS POSITION

Experienced in sewing, cutting, pattern making, quality control. Piece work rating, train and supervise and coordinate help on men's and ladies' sweaters and sportswear. Will relocate.

BOX 170D

PRODUCTION MANAGER AVAILABLE

14 years experience manufacturing and jobbing Ladies', children's and boys' sweaters, from yarn to box. Quality control, styling and patternmaking. Willing to relocate.

BOX 170C

ORDER PICKER — HEAD

Ladies' sweaters, heavy experience in checking, inventory, order department, light typing. Presently employed. Desires change for steady job with future. Best references.

BOX 174

CLOSE-OUTS WANTED

KNIT FABRICS CLOSE-OUTS WANTED

Top prices for solids, stripes and fancies.

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CONTRACT WORK WANTED: Trimming and knitting on 5 gauge flat machines. Also finishing. Box 170B

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Knitter-Mechanic wanted for Brooklyn mill. Experienced on Jacquard and Supreme circular machines. Excellent opportunity for right man. Box 170K

Will buy or consider partnership in a 6 or 7 gauge double jack flat links plant. Box 170L

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FORMULA DIMONAL 204
SPRAY STAIN CLEANING FLUID
Works with ANY GUN
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ONE SPRAY REMOVES TOUGHEST STAINS
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